

15" LAPTOPS ON TEST
FROM JUST £219!



**micro
mart**

Computing in the know

Plus

- Should Your Next PC Be A Mac?
- Why The Nexus 5 Might Be The Best Smartphone Today
- Using Advanced Techniques In SketchUp

DRONES

THE BEST
MODELS
**THE LEGAL
PROBLEMS**
THE FUTURE
**WHAT
CAN AND
CAN'T
THEY
DO?**



03-09 MAR 2016

ISSUE 1403

£2.50



9 771473 025081

tinyurl.com/mm1403mm



Find your Windows 10 Laptop at CCL

Why choose CCL for your new Laptop?

FREE Courier
Delivery

Pre-Delivery
Inspection Service*

Massive Selection
to Choose From

Perfect for Home Windows 10 Laptops

FREE P&P

**Lenovo Essential
B50-10 15.6" Laptop**

£230
DELIVERED

Intel Pentium 2.16GHz, 4GB RAM
Intel HD Graphics, 500GB HDD, **Windows 10**

Intel Quad-Core processor, Bluetooth and
Windows 10. Perfect for everyday use.

FREE P&P

**Fujitsu LifeBook A514
Intel i3 15.6" Laptop**

£290
DELIVERED

Intel Core i3 1.7GHz, 8GB RAM
Intel HD 4400, 500GB HDD, **Windows 10**

Intel Quad-Core processor, Bluetooth and
Windows 10. Perfect for everyday use.

FREE P&P

**Lenovo Essential
B51-80 15.6" Laptop**

£372
DELIVERED

Intel Core i5-6200U 2.3GHz, 8GB RAM
Intel HD Graphics, 1TB HDD, **Windows 10**

Latest Intel Skylake Core i5 processor
and massive 8GB RAM!

Performance Gaming Laptops from MSI and Gigabyte

**FREE GIFT
BUNDLE!**

**MSI GE62 6QC
Apache 15.6" Laptop**

~~WAS £879.99~~
£850
DELIVERED

Intel Core i7-6700HQ 2.6GHz, 16GB RAM,
1TB HDD, GTX 960M, **Windows 10**

Portable and powerful, the ultimate
gaming machine! FREE MSI Gift Bundle!

**FREE GIFT
BUNDLE!**

**MSI GP72 Leopard
Pro 17.3" Laptop**

~~WAS £899.99~~
£850
DELIVERED

Intel Core i7-6700HQ 2.7GHz, 16GB RAM,
1TB HDD, GTX 960M, **Windows 10**

A larger screen for increased immersion.
Free MSI Gift Bundle included!

FREE GAME

**Gigabyte P35W
v5-CF1 15.6" Laptop**

~~WAS £1379.99~~
£1199
DELIVERED

Intel Core i7-6700HQ 2.6GHz, 8GB RAM,
128GB SSD, 1TB HDD, GTX 970M 6GB,
Windows 10

6th Gen. Intel i7, NVIDIA GTX 970M,
a solid-state drive and The Division FREE!

Many more great laptop deals and offers plus a huge range
of bags, mice and carry cases online at www.cclonline.com

call: 08000 50 10 10

visit: www.cclonline.com/pc email: pcsales@cclonline.com

find us: CCL Computers Ltd, Inmoor Road
Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing
(25th February 2016). Images & designs
are for illustrative purposes only. *Laptop Checking Service
priced at £14.99 inc VAT. Please call for details.



Latest Windows 10 and Skylake PCs from CCL

Why choose CCL for your new PC?

FREE Next Day
Delivery

FREE Help and
Support

3 Year Warranty
as Standard

CCL Home and Business PC Ranges offering the best value for all the home and office computing needs.

Latest Processor

**CCL Nova 100
Home PC**

£295
DELIVERED

Intel Pentium G4400 3.3GHz, 4GB DDR4
1TB Hard Drive, **Windows 10**

Skylake Pentium processor provides
the latest Intel technology.

TOP SELLING

**CCL Nova Pro 200
Home PC**

£575
DELIVERED

Intel Core i5-6500 3.2GHz, 8GB DDR4
120GB SSD, 2TB HDD, **Windows 10**

Quad-Core Skylake Technology
with blistering SSD speed.

**INCREDIBLY
POWERFUL**

**CCL Tower 400
Business PC**

£772
DELIVERED

Intel Core i7-6700 3.4GHz, 16GB DDR4
250GB SSD, 1TB HDD, **Windows 10**

Hugely powerful system for any
office or business environment!

CCL Gaming PC Ranges specifically designed to get the most from today's popular games.

**Full HD
Gaming**

**CCL Elite Pro 100
Gaming PC**

£755
DELIVERED

Intel i5-4460 3.2GHz, 8GB RAM, 120GB SSD
1TB HDD, GeForce GTX 960, **Windows 10**

Haswell Intel i5 processor and GTX 960
for smooth 1080p gaming!

**Liquid
Cooling**

**CCL Delta Pro 400
Gaming PC**

£810
DELIVERED

AMD FX 8350 4.0GHz, 8GB RAM, 120GB
SSD, 2TB HDD, R9 380, **Windows 10**

8 Core AMD CPU and an SSD drive,
amazing value and performance!

VR Ready

**CCL Theia 100 VR
Gaming PC**

£1080
DELIVERED

Intel i5-6600K 3.5GHz, 8GB RAM, 250GB
SSD, 1TB HDD, GTX 970, **Windows 10**

Get ready for VR gaming with our new
Theia range of gaming PCs

Customise your new PC and make it your own with our PC customiser

View many more great PC offers at www.cclonline.com

call: 08000 50 10 10

visit: www.cclonline.com/pc email: pcsales@cclonline.com

find us: CCL Computers Ltd, Inmoor Road
Off Cross Lane, Bradford, BD11 2PS

Prices correct at time of going to publishing
(25th February 2016). Images & designs
are for illustrative purposes only. Monitors and desktop
bundles are available separately. Please call for details.

Contents

This week...



18

Should You Buy A Mac?



08

Drones

08 Drones

They get a lot of bad press, but drones can be used perfectly responsibly. Assuming you know what you're doing, they can be useful and/or fun for all kinds of jobs and hobbies. You do have to consider the drawbacks and legal issues too, though. To help you navigate your way through the drone market and avoid turbulence along the way, David Crookes is here to provide some sage advice

18 Should You Buy A Mac?

It's been a quite a few years now since Apple started using Intel chips and gave the world Boot Camp. This is a great way for Apple users to see what things are like on the Windows side of the fence, but should PC users be considering buying Apple instead? It might sound odd, but there are some genuine benefits to taking this route – as well as some drawbacks too, of course

24 SketchUp, Part 3

Over the last few weeks, Mark Pickavance has shown us how to go from creating simple blocks to crafting a whole house. This time around, in the final part of the series, he's taking things further and looking at more advanced techniques and features. So if you've ever fancied yourself as a 3D designer, there's no better time to give it a go

24

SketchUp, Part 3



50 Group Test: 15" Laptops

58 The Nexus 5X

50 Group Test: 15" Laptops

If all you're after is portability, then a 13" laptop will do the job nicely; if you never want to take your computer anywhere away from a plug socket, then a 17" or bigger model will perhaps be more to your liking. If you're after something that strikes a decent balance between the two, however, then one of the six 15" models we're reviewing this week should appeal

58 The Nexus 5X

For fans of vanilla Android, you can't do much better than buying a Nexus phone. These devices are the first to get the latest versions of the operating system, and they're all generally great to use. What's more, the Nexus 5X has seen its price drop significantly recently – which was more than enough to tempt Mark Pickavance, who's keen to tell you why this handset should be high on your wishlist



Also In This Issue...

57 Top 5

Sometimes, you shouldn't be too frugal

67 Remembering

David looks back at the days of massive VR headsets

87 App Of The Week

Like taking pictures of your food? Now do it in style!

Group Test 15" Laptops

- 50 Acer E1-572
- 51 Asus X550CA 15.6" Laptop
- 52 HP ProBook 455 G3
- 53 Lenovo IdeaPad G50-80
- 54 Toshiba Satellite C55-C1M9
- 55 Dell Inspiron 15 3000
- 56 Sum up

Reviews

- 42 Nvidia Shield TV 16GB
- 43 Samsung Portable SSD T3
- 44 Ricoh WG-M1 Action Camera
- 46 XQISIT S20 Portable Bluetooth Speaker
- 47 SwannOne
- 48 Soundfreaq Sound Rise Wood
- 49 Tibo Plus Mini Speakers

Experts

- 82 Ask Aaron
- 84 Ask Jason

Specialists

- 68 Linux Mart
- 69 Amiga Mart
- 70 Mobile Mart
- 71 Hardware Mart
- 72 Gaming Mart

News

- 36 The Latest News
- 66 Your Letters

Regulars

- 32 Subscriptions
- 74 Ad Index
- 76 IT Essentials
- 78 Classifieds
- 88 Logging Off



SAVE A BUNDLE

Subscribe to Micro Mart today and save 24% on the shop price.

Call 0844 844 0082

Basic annual rate

UK: £77.50

Europe: £185

Rest of World: £340

Online subscriber service

Change your address and renew your subscription at

www.subsinfo.co.uk

Email:

micromart@servicehelpline.co.uk

SUPERB MORGAN BARGAINS • WITH EXTRA 10% DISCOUNT!*

MASSIVE COMPUTING SALE!

WITH AN EXTRA 10% DISCOUNT*

Get an extra 10% OFF most new sale items or almost anything on our site!

Just visit our website today www.morgancomputers.co.uk

Enter the promotional code **MMTEN** at the checkout online and see your prices reduce by an extra 10%! OR call **FREEPHONE 0800 008 7451** and we'll do the work for you!

Toshiba Portege R930 Powerhouse Laptop!

Lightning fast 13.3" laptop with superb graphics & SSD Drive!

Light, powerful and easy to use! A stunning ultra light touch screen laptop that runs Windows 10 has a fast Quad core processor, plenty of hard drive space and RAM to run every day apps and programs with ease. Use keyboard, mouse or screen and interact better than ever at a fraction of the original price.

- 2.9GHz Turbo i7 processor
- 8GB RAM • 128Gb Solid State Drive
- 13.3" HD • Wifi • Ethernet



Part Code: 47509

NOW ONLY
£359.96

TOSHIBA
WAS (Past Amazon Price) ~~£1300+~~

HP 8000 ELITE SPECIAL!

Now with an incredible 8GB DDR3 RAM, a Massive 1TB HDD, WiFi and a 1GB Graphics card the reliable and powerful 3.0GHz Core2Duo Intel processor will make short work of most tasks!

- Intel Core 2 Duo E8400/3 GHz (Dual-Core)
- 3.0 Ghz • 8GB RAM (installed)/16 GB (max)
- 1TB - SATA • DVD/CD • Stereo Sound
- Network: Wi-Fi & Gigabit LAN • Asus G210 Graphics
- Ultra Small: 33.8 cm x 37.9 cm x 10 cm
- Windows 7 Professional Operating System

TOP SPEC! LOW PRICE!

NOW ONLY
£224.96



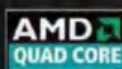
Part Code: 41820



Part Code: 46273

HP PAVILLION 15.6" PERFORMANCE LAPTOP!

Perfect for both work and play, the HP Pavilion 15.6" laptop offers great-value home computing!



Fast AMD processor and AMD Radeon HD 7600G Graphics provides power, speed and uperly vibrant colour and smooth graphics from a responsive all round laptop. Comes with Windows 10 OS as standard!

- 1.9GHz AMD A8-7410 APU Quad Core Processor
- 8 GB DDR3 RAM • 500 GB Hard Drive
- DVD-RW Optical Drive
- 15.6" 1366 x 768 Hi-Res Ultra Bright Screen
- AMD Radeon HD 7600G Graphics
- Wi-Fi • Ethernet • USB ports • HDMI
- SD card reader • HD webcam

MAJOR PRICE REDUCTION!

NOW ONLY
£314.96

HP Z400 QUAD CORE TOWER PC

AN IMPRESSIVE & POWERFUL PC
Designed for multi-tasking and high performance applications, programs and more!

Built for professionals, designers and coders. These almost server spec machines make a simply stunning High power work station for even the most demanding user.

- Intel Xeon 3.06GHz Processor • 16Gb RAM
- 2TB 7200RPM HDD • Quadro 2000 NVIDIA graphics
- DVD Super multi • Ethernet • 12 x USB • Win 7 Pro



Part Code: 4346

NEW LOW PRICE!

NOW ONLY
£341.96

23" QUAD CORE i5 ALL-IN-ONE HP DESKTOP PC

HP Compaq 8200 Elite All-in-One PC



Part Code: 47506

- Intel Core i5-2400S Quad Core 2.5GHz Processor
- 4GB DDR3 RAM
- 500GB SATA HDD
- DVD-CD/RW Drive
- Keyboard & Mouse
- 23" Full HD HP LCD Backlit Screen with speakers
- Windows 7 Pro
- Webcam

NOW ONLY
£341.96



SPECIAL LOW PRICE!

PRICES INCLUDE

AN EXTRA 10% DISCOUNT

PRICES SHOWN INCLUDES AN EXTRA 10% DISCOUNT* Buy most of these products and claim a special MicroMart readers ONLY extra 10% discount!

Go to our website and place your order for any of these superb offers. Enter your special promo code **MMTEN** at the checkout online to enjoy these specially reduced deals

All Prices include VAT
Monday to Friday
8.30AM TO 6.00PM

MorganComputers

*The extra 10% discount is unavailable on a very few selected products

E&O. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.



SPECIAL PROMOTION OFFER!

**OUR CHEAPEST
NETBOOK DEAL EVER!**

Samsung 12.1" Dual Core 3G & Wi-Fi Chromebook

All the internet, all the time for UNDER £100!

Super light 1.4Kg Intel dual core 12.1" Chromebook with 2GB RAM a 16GB SSD! This go anywhere chrome book runs Google chrome as an OS! No laggy windows to worry about here. Access your email, browse the web, view photos and videos. Work on-line in real time with Google documents or spreadsheets presentations and more.

Get online almost anywhere with built in Wi-Fi and unlocked Mobile 3G internet (just add a SIM card), superb Battery life! Up to 6.5Hrs from one charge, starts up in just 8 seconds... Access photos and videos via USB or using the built in Memory card reader.



SAMSUNG

- Processor: Atom Dual Core 1.66GHz ● Display: 12.1" LED 1280x800
- Hard Disk: 16GB SSD ● RAM: 2GB ● Wi-Fi: Yes ● 3G: Yes
- USB: 2 x 2.0 ● Webcam: Yes ● Card Reader: 4-in-1
- Keyboard: US English ● OS: Google Chrome

CURRENT
AMAZON PRICE ~~£199~~

A MASSIVE SAVING!

**NOW ONLY
£99.95**

SPECIAL PROMOTION PRODUCT PRICE
Not included in the extra 10% discount offer



Part Code:
4272



www.morgancomputers.co.uk

Or Call FREEPHONE 0800 008 7451



**GET A COPY OF
OUR CATALOGUE!**

Scan this QR code to go online,
order your free catalogue and
we will rush you our latest
greatest offers by post

PRICES SHOWN INCLUDES AN EXTRA 10% DISCOUNT* Buy most of these
products and claim a special MicroMart readers only extra 10% discount!
Go to our website and place your order for any of these superb offers at our standard discount price.
Enter your special promo code **MMTEN** at the checkout online to enjoy these specially reduced deals!



Game of Drones

Drones are proving to be more popular than ever. So join David Crookes as he looks at some of the best models and the legal problems surrounding unmanned aerial vehicles



There may well come a time, perhaps in the very near future, when a major city will see the whole sky blacken above it as drone after drone takes to the air. It will be reminiscent of the looming shadow cast by the spaceship over New York in the film *Independence Day*, only this shadow will be

fragmented; a buzzing mass of whirring quadcopters battling for supremacy in the sky.

As prices fall, and more and more people become aware of them, drones have become incredibly popular over the past few years. They're infiltrating all corners of popular culture with kids now set to enjoy toys like the new 'Drone Barbie', which can fly around on a quadcopter, and scores of viewers settling down to watch a futuristic drone combat show on CBBC called *Airmageddon*.

Combined with numerous art installations and compelling adult-driven races, drones makes up a soaring trend which shows no sign of slowing down. The Consumer Electronics Show in January was proof of that, but the momentum has been building for years. Numerous new models were being showcased across the event, bringing with them some exciting new innovations.

In many ways, drones are the successors to the radio-controlled model aircraft that hobbyists manoeuvre using a handheld radio transmitter to communicate with an on-board receiver. Yet they are easier to fly, they combine with a wider range of interests and they

is not only a great looking machine but also easy to fly – and therefore perfect for beginners. It comes with a 12 megapixel camera with a f/2.8 prime lens and a 1/2.3" sensor that can take JPEG or DNG RAW files if you want the very highest, no-compromise quality from your aerial shots.

It can also shoot 2.7K video – which is close to three times the clarity of HD – at 30 frames per second, as well as 1080p and 720p. Even better, you can control all of this using the DJI Go app on a smartphone or tablet and then instantly share

the results via social media.

What we especially like about the DJI Phantom 3 Standard is that it has a 94° field of view, which is perfect for those who don't want to take photos that look as if they've been taken through a fisheye lens. In line with higher-end drones, there is image stabilisation for less migraine-inducing footage.

All that said, there is a new drone in town that is even better: the brand new DJI Phantom 3 4K, which was announced at the CES. As the name suggests, it upgrades the camera to a 30fps 4K model. At £699, it's a lot more expensive – around £300 more than the Standard is going for these days – but it certainly gives you food for thought.

“ The Drone Racing League in the US is already lucrative ”

come in so many different shapes and sizes that there really is something out there for everyone.

Great For Photographers

Perhaps the most common use for drones is aerial photography since they're able to deliver amazing shots from high in the sky. Many people strap a GoPro camera to their drones (or buy quadcopters with a camera built-in) and while it has led to lot of height-advantage shots of houses and events, it has also led to the growth of some extreme-action videos. A quick glimpse on YouTube will show you exactly what we mean.

So if photography is your thing, then consider the DJI Phantom 3 Standard, which

Best On A Budget Parrot Rolling Spider

This cool minidrone can be used both indoors and outdoors. With a range of 66 feet (20 metres), it has a 0.3MP camera and it can be controlled using a smartphone. It went down well when it was launched back in 2014, picking up a fair few awards, and it remains a great buy today. There was praise for its autopilot mode – based on a three-axis gyroscope and three-axis accelerometer – and its size (it will fit in the palms of two hands). As for why it's called the rolling spider, well it has two large but removable wheels which lets this bug-like drone roll around.





Before you do splash the cash, it's worth checking out websites such as Dronestagram (www.dronestagr.am) to get a flavour of what a drone is capable of doing. These sites are packed with images usually broken down into various categories ranging from urban, country, industrial, pro, amateur, sports and video and they are nearly all inspiring. Who knows, you may even want to jump straight in at the deep-end with a drone like the Turbo Ace Matrix. It may be more than £2,000, but it comes with an 8" monitor and it can stay airborne for 25

minutes and fly for 1.2 miles, which is more than enough time to allow you to perfect even the furthest away of shots.

In fact, range is an important consideration for any drone. You don't want to suddenly lose reception as you're gearing up for a great shot just because you've lost sight of your drone's distance. Equally you have to think about the battery life. Lots of streaming and flying can seriously drain the juice so look out for the manufacturers' claims and read reviews carefully online before stumping up for something.

The Middle Market Drone

Parrot AR.Drone 2.0

Parrot is a top name for unmanned aerial vehicles and this AR.Drone 2.0 has many fans. It may only last for around 35 minutes in the air but it comes with everything you'll need to get going except for a controller (it has smartphone and tablet control). There are two built-in cameras that can record in 720p quality, although it won't capture any sound. There is also great stabilisation and a return home mode so that it won't get lost. Flights can be viewed in 3D and the director mode lets you program automatic movements, raising your movie-making skills up a notch.

Perfect For Racing

As well as photography, another great use for drones has begun to emerge relatively recently: first-person drone racing. It's a highly exciting arena for the technology with competitors wearing a headset that receives a wireless live stream from the drone they are flying and beaming the footage straight into their peepers. As the drone is flown at speed users get to see what the quadcopter is viewing, giving the sensation of actually sitting inside the cockpit rather than holding a radio controller and moving a couple of sticks to navigate it through the air.



cocktail Audio



Cocktail Audio Pro X100

High Resolution Digital Streamer, NAS and Ripper with DSD/DXD Playback. The latest X100 model merges CD ripping, Network Attached Storage (NAS) and multimedia streaming with an open platform. Pro X100 is compatible with most audio devices and delivers hi end audio and DSD music with an outstanding flawless output. Supports upto 8TB HDD. Some features are as below

- Fast auto rip, fingerprinting & album cover art fetch
- Simple SONOS auto configuration option
- Customise settings- Install & uninstall features
- Flexible USB & NAS (SMB) mount option
- Quick backup including incremental & log display
- Streaming Services playback...enqueue structure
- Category options on playback media control
- Control with any smartphone, tablet or PC
- Additional tools to playback on controllers
- Cocktail Audio Pro (X100) can be customised
- Intel T-D Quad Core CPU 2.0Ghz
- Music library mirroring option
- USB Audio interface (asynchronous output)
- Private cloud based online music metadata service
- Share files via streaming protocols like SMB, NFS, UPNP, Airplay, DLNA ...
- Indexes through Squeezebox Server integration
- Media server for video, audio and picture streaming
- Power efficient



Cocktail Audio Mini X9

A CD ripper, convertor and burner. X9 is a powerful portable device for lossless digital storage which rips in FLAC. Record from cassettes, LPs or any analogue feed using the LINE IN port. Access songs on USB flash drive or SD memory card effortlessly. Music can be played, imported, moved, exported and created without any hold-ups among your collection.

A 70 minute CD would be done in less than 6 minutes - with CD information embedded. Access CD Metadata Online or Use CD Text Display and much more. No PC required. Works with active speaker & headphone.



BF11 Wireless Stereo Speaker

Wi-Fi, Bluetooth(4.0 aptX®) & AUX. Engineered for exceptional sound, BF11 is a combination of digital media rendering with the latest streaming protocol. Touch interface, supports airplay, DLNA, UPNP, Wi-Fi streaming and much more.

- » Touch technology interface
- » Firmware upgradable
- » Supports Airplay (iphone/ipad devices)
- » Supports devices on iOS, Android, Win ...any wireless device.
- » Supports Network/PC Streaming
- » Free optional stream via 'WI-FI Music' App & other compatible Apps
- » Easy pair from network to Bluetooth or physical connection (AUX)



Of course, given there is expensive equipment being used, there is a great element of risk of damage with this so it's not one for beginners. For some, however, the danger is part and parcel of the fun. Crashes are par for the course, certainly when you first get started, but even experienced hands will see their drones smashed into the ground from time-to-time usually as a result of some over-zealous racing. Some groups take it further and set up courses that are packed with hazards and fun twists and turns. Indeed, the CBBC programme we mentioned earlier taps into this and it's only a matter of time before adult television shows sense the opportunity too.

In the meantime a few leagues have been set up together with the UK Drone Nationals, where the best pit their skills against each other. There is hope of following in the footsteps of the Drone Racing League in the US, which is already lucrative. A World Drone Grand Prix in Dubai has also been amazing people with its speed and freestyle categories – flown by heavily sponsored competitors hoping for a \$1 million prize. There are some who believe drone racing will be as big as videogame e-sports which, for live

streaming games service Twitch, already shares a pot of some \$3.8 billion each year so perhaps now is time to get a slice of the action.

The Walkera Furious 320 is one to consider since it is specifically geared up for racing, not only able to reach speeds up to 75 miles per hour, but doing so with great stability and control. It has a small pitch and it is able to rotate, roll and flip with ease while recording every moment with its 12 million pixel HD lens that has

certain skill to drone racing this will come in handy for those mishaps. We also like that this machine costs less than £600. It's a steep price, for sure, but not as expensive as some racing drones can be.

Having said that, there are some lower costs alternatives and one of the coolest things we've seen for a while is the ByRobot Petrone Drone Fighter, which not only allows for first person video streaming to a headset but adds a host of interactive features too – not least lasers than can be used to shoot at each other.

The drones were unveiled at the CES and they are aimed at older children – but that's not to say adults can't have a lot of fun with them. Looking like an evil bug with four propellers, they have an accompanying app and on-board barometer,

camera, accelerometer and gyroscope, meaning they are fully equipped for some serious sky warfare.

There are certainly lots of little quirks. Petrone Drone Fighters can auto-hover and are fully programmable, making them perfect for hobbyists. What's more, by running your finger over the smartphone app, you can make them fly in a set pattern, and it has voice control so you can deliver direct instructions such as

“ Enjoy a new Drone Barbie, which can fly around the house on a hidden quadcopter ”

a shooting AF speed of up to 0.1 seconds. It can be controlled using the open-source system CC3D and even record its return point and figure how much time you can have in the air before it needs to head home (automatically making its way there if you don't take action).

The good thing about this drone is that it has a modular design and that enables users to switch out any components that may become damaged. Since there is a

Great For Taking Photos

DJI Inspire 1

We do like the DJI Inspire 1. The 4K video and the clear 12MP photos it is capable of taking help it to rise above the majority of its rivals. It offers full 360° rotation and a maximum transmitting distance of up to 3.1 unobstructed miles. It has also been certified to work with Apple's iMovie and Final Cut Pro X on OS X so you can be sure, if you're a pro, that you'll be able to take the output – whether JPEG, DNG or MP4 – and easily work with it when it comes around to editing your footage together.





Cluster

Our revolutionary NEW Web Hosting platform



**100% guaranteed
uptime!**



**Smart SSD storage
& intelligent load
balancing**



**Dedicated SSL
certificates**

Web Hosting from:

£1.99

per month ex VAT charged at 20%

Call **0333 0142 708**

or visit **fasthosts.co.uk/hosting**

SERVICES • WEB HOSTING • DOMAIN NAMES • EXCHANGE EMAIL





“follow me” too. But it’s the ability to shoot that takes it to another level, bringing a straightforward gaming element to real-life drone flying, as players seek to amass as many points as possible while watching their flying machines do battle.

“ You can’t fly drones over airports, high-security prisons, military sites or nuclear power plants ”

Practical Drones

Even so, we know there are lots of people who prefer practicality when it comes to their technology and the good news is that drones are great for checking out hard to reach places. Many drones such as the new forthcoming JIYI Robotics X380 have obstacle avoidance, so if you’re looking to take it upwards to look at your roof tiles, for instance, you can rest assured it’s not going to go crashing into

your chimney and cause further damage. Indeed, obstacle avoidance is fast becoming a much-wanted feature within the drone market because it offers some extra protection and makes it less likely you’re going to damage the machine, property or, most importantly, people.

One drone that is making a feature of its difficulty to crash is the Parrot Disco. With its wing-shape, it looks different to most of the other drones we’re discussing

and it doesn’t require any piloting skills. Once it’s thrown into the air, it can be controlled on a tablet using the Flight Plan app.

It has three-axis digital stabilisation and the all-too-crucial autopilot mode that lets you play around with the pitch while avoiding any stalling: the computer will control the drone and simply let you do what you need to, which is take images. The Loiter mode will ensure the drone is stable enough in one place for proper examinations. The only problem is that you’ll have to wait until later in the year to get your hands on it.

Right here and now, though, we are seeing drones being used for lots of real-life situations. There is delivery drone technology being pioneered by companies as diverse as Amazon and Domino’s and some professionals such as **Redcopters.co.uk** are already using drones to carry out aerial roof and chimney inspections. Flying around a building is far quicker than having to get some ladders out or erect a platform, after all.

However, this sort of use has not gone unnoticed by criminals, unfortunately. A report in *The Independent* newspaper said gangs were using drones to survey the roofs of churches in the search for lead potentially worth tens of thousands of pounds. It’s no surprise, though: criminality and drones do appear to have strong links.



One To Replace Your Car EHang 184

Okay, so you're not going to be able to get your hands on this drone for a while yet (and even if you did, you may stumble when it comes to the £200,000 price tag), but if you're not drooling over the EHang 184 then we'd be very surprised. This Chinese-manufactured self-piloting eight-rotor aircraft is capable of carrying a single person to any destination chosen on Google Maps (as long as it is within 23 minutes of your current location and you have around four hours to kill while it charges back up for the return leg). It was showcased at the CES, where there were lots of details about its ability but there was sadly no demonstration of it actually leaving the floor. When it zooms into action, there will need to be command centres so that, should the user get into trouble, the craft can be safely brought back down to earth – but, of course, there is going to be a lot of red tape to get through before this drone gets off the production line and on to the lawns of houses everywhere.

The Dark Side

Late last year it emerged that the police in Tokyo had taken to buying interceptor drones in order to fly up to suspicious looking drones and catch them in a net. That's because in Japan there is much paranoia about the use of drones for spying, and there is also worry that they will be used for terrorism. A drone carrying trace amounts of radioactive caesium was found in the city, which put the authorities on alert and planted the idea that a gang could one day use drones to wreak havoc.

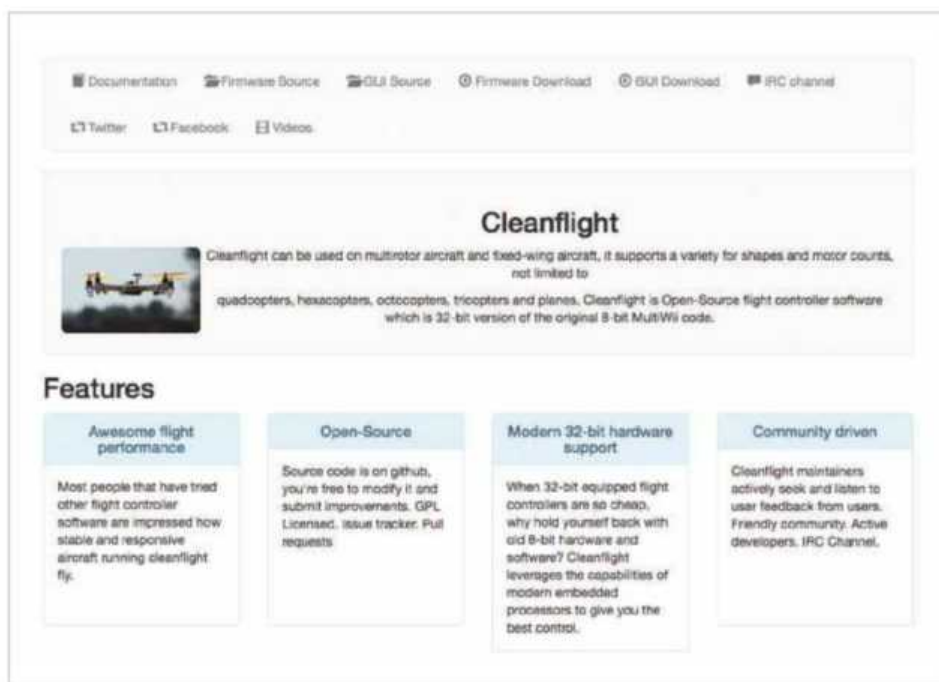
The fear of drones even extends to companies looking to protect their valuable intellectual property as well. The producers of *Star Wars: Episode VIII* have, we're told, bought in their own drones with the intention of targeting others that are hoping to grab spy footage by flying over the set of the much-anticipated new movie. Their caution is not unfounded, problems had arisen during the making of *The Force Awakens* that prompted a stronger response this time around. It conjures up images of drone wars with some scintillating duels in the sky. The reality will probably be more mundane but caught our imagination, it has.

Yet what about here in the UK? Well, police have been told to be on their guard. Officers have received 28-pages of guidance which, courtesy of a leak to the magazine *Wired*, was shown to lay down a series of instructions on how they should deal with them. Specifically, they are being warned to be on their guard for the potential use of drones for terrorism and they are told to ask to see any recorded footage – even though they know the user can actually refuse unless they are suspected of being a terrorist.

The guidelines also clearly state that they want users to be able see their drones at all times, though, so the police can arrest people who wear first person headsets and most likely will do if they feel you're in a public place and potentially endangering others. One thing they won't do, though, is snatch the controls out of your hand and attempt to land it. They'll ask you to do that and will only do it themselves if they really, really have to.

The guidance was apparently necessary because of a growing number of complaints about drones, which means users should be careful when using them. Anyone operating a drone

has to do so under the same legal considerations as those who fly model aircraft – and the key part of those regulations say that users must take care not to endanger life or property nor act in any reckless or negligent manner. The Civil Aviation Authority can prosecute people who fly drones illegally and that has to be a chief concern for anyone who is looking to operate one.



The regulations are laid down in the Air Navigation Order which you can view in full at tinyurl.com/gvkpmle. In general, they say drones have to be less than 20kg unless you are in a specific area of the UK such as ParcAberporth aerodrome in West Wales. You also need permission from the CAA if you plan to fly the aircraft on a commercial basis or fly a camera/surveillance fitted aircraft within 150 metres (492 feet) of a congested area and you will only be granted it if you can show that you are a competent operator.

You certainly can't fly over organised gatherings of more than 1,000 people which puts the filming of many demos or concerts out of reach. And you can't – as you'd imagine – fly drones over airports, high-security prisons, military sites or nuclear power plants (not that is has stopped some from trying anyway: there were 33 incidents of unmanned aircraft detected in or around prisons in England and Wales last year).

Drones with a camera always have to remain at least 50 metres (164ft) away from a person, building, structure or vehicle. Also, as we've mentioned before, the drone has to remain within the line of sight of the operator – as the police guidelines pointed out.

In practice, though, anyone using common sense will be left alone, and the rules are sensible enough to protect members of the public while allowing you to have a lot of fun. The key is to avoid invading people's privacy and ensuring anywhere you fly is safe and

appropriate – so, just good manners, basically. Taking your new drone for a look-see over next door's fence when the owners are sunbathing would be wrong, and downright creepy if we're honest, but it has been known to happen (in fact, a father was arrested last year when he shot down a drone in Louisville, Kentucky that he believed had been filming his daughter while she was sunbathing).

Future Hopes

While there are concerns about the growth of drone usage, as the months and years roll by it is hoped there will be a growing acceptance that this is technology that can do good. It could be that the UK follows America's lead by issuing fines as high as \$250,000 for anyone not registering drones with the Federal Aviation Administration but, as it stands, there is no need for such measures. Instead, what we are seeing are some major strides forward that could make drones a very positive part of our lives.

Amazon, for instance, has been regularly dishing out updates on its much-hyped drone-based delivery service, which it still looks like it wants to push ahead with. There is no firm roll-out date as yet, but it's a technology leap that has the potential to revolutionise internet shopping. As it stands, the regulations wouldn't allow them to be used legally, though, because they leave the eye-line of operators and – of course – would need to be flown in built-up areas. It could well be that the laws are relaxed once the safety of the deliveries are established as being within reasonable parameters, and it would folly to put too much red tape in place before the technology has had a chance to prove itself.

We've already seen a host of technological strides that have succeeded in making not only more commonplace, but safe. We're likely to see more in the next few years (along with, ironically, a growing sideline of anti-drone technology – but we'd assume that levels of protection would be offered to bona fide operations). We are also beginning to see a great rise in the creation of DIY drones – those which are self-assembled by hobbyists and often have small computers such as the Raspberry Pi 2 and Raspberry Pi Zero at their heart – as well as open source software controllers including Cleanflight (cleanflight.com).

At the same time, there are more and more 3D printable drones including those that claim to be military grade (the US Army is also considering 3D printing drones for action, allowing them to be produced on location and customised for various scenarios). It may even lead to an eventual crop of throwaway drones that are able to be knocked up for certain situations. Imagine leaving a nightclub or a restaurant and have the business owner quickly produce a 'follow-me' drone that will see you home safely. While all of this may be in the realms of sci-fi right now, there is still a sense that we are only really at the beginning. [mm](#)

The Intel Drone

Not content with being inside millions of PCs, Intel wants to become ubiquitous in the field of drones too. A drone called the Yuneec Typhoon H includes the chip-maker's 3D Real Sense camera, which gives the quadcopter a sense of what is around it, allowing it to avoid obstacles in its path. It has been showcased following a biker riding up a road without any problems and Brian Krzanich says it is "the world's first truly intelligent consumer drone". Intel is not the only chip manufacturer making in-roads, though. Ambarella's H12 chip includes advanced 3D electronic image stabilisation while its H2 is capable of 4K video at 60 frames per second.

WARNING: MORE THAN JUST A PHONE CASE



**YOU BREAK
YOUR PHONE,
WE FIX IT!**

THE SHIELDX2 REPAIR & REPLACEMENT PROMISE

If your phone breaks whilst in your ShieldX2 case, we will repair or replace your phone!*

Thin, sleek and transparent, you can barely tell that it is on the phone. We have cases available for new and old phones from all major brands. Our 12 month Repair or Replacement Promise combined with the shock absorbing ShieldX2 case means that your phone is protected from things such as:

- Cracked screen
- Water damage
- Mechanical failures

MORE THAN JUST A PHONE CASE. We have you covered!!!



DROP IT!



BANG IT!



SPLASH IT!



SMASH IT!



*Terms and Conditions apply



shieldx2.com

Should Your Next PC Be A Mac?

Apple Macs run Windows rather well. Roland Waddilove ponders the pros and cons of buying one for running Microsoft's OS

Apple Macs and Windows PCs are seen as rivals, but PC is short for personal computer and therefore Macs are a type of PC. They can also be persuaded to run Windows, including Windows 10, and there are several ways of doing this. In fact, they make pretty good Windows computers. So, would you consider buying a Mac and running Windows on it?

It is true that there are some expensive Macs, and that not everyone can afford to buy a top of the range model. However, down at the bottom of the range are some cheaper models, and you can buy a brand new Mac for under £400. There is also a way to get them even cheaper. Go to apple.com/uk website, scroll down to the bottom of the page and click the 'Refurbished' link. When we looked there were Macs from £330.

There are lots of secondhand Macs for sale too and they are easy to find on eBay. Some models are priced as low as £125. They are used, but they do last well. There are even Macs offered for sale in Micro Mart's classifieds occasionally too. You won't find one every week, but it's worth checking.



▲ Boot Camp Assistant is used to install Windows in a partition on the Mac



▲ Running Windows 10 in a partition on the Mac – it works perfectly

Running Windows On A Mac

Before looking at the hardware, let's first take a look at what is required to run Windows on an Apple Mac. There are two methods of doing it: Windows can be run as a virtual machine or it can be installed in a partition on the disk drive to create a dual boot system. This second method is the best because Windows runs natively on the hardware and the Mac becomes a Windows PC. You can even set it to boot into Windows by default, instead of OS X.

“ Macs are a type of PC. They can be persuaded to run Windows, including 10 ”

Installing Windows in a partition is easy, and Apple provides a very simple utility that does the job for you. To begin you must download Windows 10 as a .iso file from the Microsoft website (bit.ly/1PEJ90k). It needs to be a full copy with a license code, which is £100 from Microsoft, but it is available a lot cheaper than that elsewhere, including some of *Micro Mart's* advertisers.

Run Boot Camp Assistant in the Applications > Utilities folder of the Mac. It asks you how much disk space to allocate to Windows and then it downloads the drivers needed, such as for the video card, mouse, keyboard, and so on. Plug in a USB flash memory drive of 4 or 8GB and it is turned into a bootable device containing Windows installation files. Boot Camp Assistant then reboots the Mac and Windows installs in the new partition that is created.

The other way to run Windows requires VirtualBox, which is free or Parallels Desktop (parallels.com) costing £65. On top of that, you need a licensed copy of Windows to install. Although Parallels is better, VirtualBox does a good job for a free tool.

Run VirtualBox, click the New button in the toolbar, select the version of Windows to use and follow the prompts. There aren't many and you just need to set the size of the virtual disk, and one or two other settings. A .iso image of a Windows DVD can be attached or a real DVD can be used to install the OS into the virtual machine. It will run Windows 10, but Windows 7 performs better. If you have enough RAM to give it 4GB, allocate a couple of CPU cores, and switch to full screen mode, Windows runs very well.



▲ The Mac Mini is perfect for Windows – and works with existing peripherals

Mac Mini For Windows

Everyone knows that Apple computers are really expensive, which is true for most of the models the company sells, but there is one Mac that is cheap and is perfect for PC users. This is the Mac Mini, which is a tiny computer no bigger than a book. The price of the base model is just £399, which is in the middle of the desktop PC price range. There are cheaper Windows PCs, but there are also more expensive ones too.

The cheapest Mac Mini has a 1.4GHz dual-core Intel Core i5 with Turbo Boost up to 2.7GHz, but a Core i7 processor is available as an option. The minimum memory is 8GB and for people that need more, there is a 16GB option. Storage is provided by a 500GB traditional disk drive, but 1TB and 2TB fusion drives are available. An Apple fusion drive is a traditional mechanical disk drive with a small SSD. The idea is that the SSD holds the operating system and applications, but other files are stored on the disk. It enables the system to boot and start programs faster, but you have lots of storage for your media libraries and other files.

Although the price starts at £399 and the specification is reasonably good, if you max out a Mac Mini – with a 3GHz Core i7, 16GB of RAM and 2TB fusion drive – the price rises to £1,224



▲ The AOC U2868PQU 4k monitor has a resolution of 3840 x 2160 at 60Hz



▲ The Logitech K380 keyboard has key logos for the Apple Mac and Windows PC



▲ A bluetooth mouse like this Logitech M535 will work on Windows and Apple Mac

and it begins to look expensive. Not everyone wants to spend that much on a computer, but the base mode is actually fine for running OS X and applications, and for installing and running Windows.

One reason why the Mac Mini is perfect for PC is because there is no screen, keyboard or mouse. It is designed to be used with third party peripherals and what's important for PC users is that they do not have to be made by Apple.

There is an HDMI socket at the back, which enables it to be connected to any monitor or television that also has an HDMI socket. This has become the standard for modern monitors, but if you have an old one you can use an HDMI to DVI adapter or even DisplayPort to VGA. Surely no one still uses a VGA monitor, though? The Mac Mini supports 1080p displays at 60Hz, 3840 x 2160 pixels at 30Hz and 4096 x 2160 at 24Hz.

If you want to hook up a 4K monitor to the Mac Mini then it is certainly possible and the price of these super high resolution screens are steadily falling to affordable levels. The AOC U2868PQU (bit.ly/1mgkgMG) is amazingly cheap at just £384. This 28" 4K Ultra HD monitor offers full HD, 1ms response times and 60Hz refresh rates. It is one of the least expensive 4K monitors and is best suited to budget computers like the Mac Mini. You could pay up to £1,000 for a top of the range 4K display, of course, but you really don't have to.

Another reason why the Mac Mini is good for PC users is because you can add any keyboard and mouse. It has four USB sockets, so you could plug in standard wired devices, but it also has

Bluetooth, so you can go wireless. The cheapest Apple keyboard costs £40, is very slim and compact and looks great. It is also unlike most Windows keyboards in terms of layout, so if you plan to use Windows a lot on your Mac Mini then you will find that there are cheaper and more suitable alternatives.

There are many wireless keyboards and a typical one is the Logitech K380 Multi-Device Bluetooth Keyboard. It has the slightly cheaper price of £35, but what makes it so good for the Mac Mini is that it has both Mac and Windows logos on the keys. Most of the keys on Mac and Windows keyboards are the same, but there are a few special keys. For example, PC keyboards have a Windows key, but Macs have a Command key. PC's have an Alt key, but Macs have one called Option. Macs also have special function keys to adjust the screen brightness and audio volume, and a few others. The Logitech K380 has dual logos on some keys to show the PC and Mac functions.

The keyboard runs on two AAA batteries that have an expected life of two years. It can connect to three devices simultaneously, such as a PC, a Mac and an Android or iOS device, and Function keys 1, 2 and 3 switch between them as you type. That is a clever trick and it is useful to pair a mobile phone or tablet with it and use it to enter emails, text messages, notes and so on.

The Apple mouse costs £40 and it is not loved by everyone, not even all Mac users. In fact, Apple has a history of making strange mice for Macs and there have been some weird ones. Some Apple mice are touch sensitive and have no left or right buttons, which makes them a bit awkward to use.

There are alternatives, though, and plenty of them. The Logitech M535 Bluetooth mouse can connect to almost any device, which includes Windows, Apple Macs, Chrome OS, and Android phones and tablets. It costs £35 and it will run on a single AA battery for around 10 months. It is perfect for running Windows and OS X on a Mac Mini.



▲ Dell's alternative to the Mac Mini is cheap, but underpowered



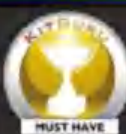
AWARD WINNING GAMING COMPUTER SPECIALISTS

DESIGN YOUR OWN DREAM GAMING PC ONLINE TODAY

www.falconcomputers.co.uk - Tel: 0191 5676669



PREDATOR XV GEFORCE GTX VRREADY



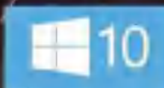
AWARD WINNING GAMING SYSTEMS

The Falcon Predator XV Elite Gaming PC is packed Full Of Advanced Features including the Nvidia VR Ready GTX 970...

Case: NZXT S340 Gaming case
Board: ASUS Intel Z170 Mainboard
CPU: Intel I5 6600K 3.5Ghz Quad Core
RAM: 8GB DDR4 2400 Gaming Memory
GFX: Nvidia GTX 970 (ASUS TURBO)
HDD1: 250GB Samsung EVO SSD
HDD2: 1TB Seagate 7200RPM - 64Mb
OPTICAL: Optional Extra
PSU: 500w EVGA PSU Bronze 80+
OS: Microsoft Windows 10 64Bit
AV: Bullguard Internet Security
Warranty: 2 Year Parts 3 Year Labour

*Quick Find Code: PREDATOR XV

FROM ONLY
£999.99
INCLUDING VAT



OFFICIAL NVIDIA PARTNER

NVIDIA GEFORCE GTX



FALCON RECOMMENDS AOC MONITORS

WWW.FALCONCOMPUTERS.CO.UK



INCLUDES
128GB SSD
+ 1TB
STORAGE
DRIVE



Ghost Warrior Gaming PC

- Zalman Z3 PLUS - White
- AMD 7870K Quad 3.96Ghz R7 GFX
- AMD Branded CPU Cooler
- Gigabyte GA-F2A68HM-HD2 FM2+
- 8GB Kingston HyperX 2133MHz
- AMD Radeon R7 Onboard 3D GFX
- 128GB SSD + 1TB Storage Drive
- 500W 80+ 12cm Fan Aerocool PSU
- 24X Samsung DVD-RW Drive
- Windows 10 Home (64-bit)
- Bullguard Internet security 1 Year
- 2 Year Parts 3 Year Labour Warranty

£459.99



INCLUDES
128GB SSD
+ 1TB
STORAGE
DRIVE



Z10N - STORM GAMING PC

- Game Max Falcon Gaming Case
- Intel i5 6400 2.7/3.3Ghz Skylake
- Intel Branded CPU Cooler
- ASUS H110M-A DDR4 - Micro ATX
- 8GB DDR4 2133 Hyper X FURY
- 2GB ASUS GeForce GTX 750 TI
- 128GB SSD + 1TB Storage Drive
- 500W 80+ 12cm Fan Aerocool PSU
- 24X Samsung DVD-RW Drive
- Windows 10 Home (64-bit)
- Bullguard Internet security 1 Year
- 2 Year Parts 3 Year Labour Warranty

£619.99



INCLUDES
128GB SSD
+ 1TB
STORAGE
DRIVE



G8 Raider Gaming PC

- Aerocool Dead Silence Cube - Red
- Intel Core i5-6600K Quad Core
- Intel Branded CPU Cooler
- ASUS B150 Motherboard
- 8GB DDR4 HyperX Fury 2133MHz
- 4GB NVIDIA GeForce GTX 970
- 128GB SSD + 1TB HDD
- 500W 80+ 12cm Fan Aerocool PSU
- 24X Samsung DVD-RW Drive
- Windows 10 Home (64-bit)
- Bullguard Internet security 1 Year
- 2 Year Parts 3 Year Labour Warranty

£899.99



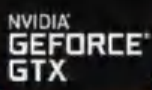
INCLUDES
240GB SSD
+ 1TB
STORAGE
DRIVE



OBLIVION Gaming PC

- Core V31 Mesh Gaming Case
- Intel i5 6600K 3.5/3.9Ghz Skylake
- MSI Dragon A10 Water Cooler
- ASUS Z170-P Socket 1151
- 8GB DDR4 2400 Hyper X Fury Black
- 4GB NVIDIA GeForce GTX 970
- 240GB Samsung SSD + 1TB HDD
- 500 Watt FSP 80+ PSU
- 24X Samsung DVD-RW Drive
- Windows 10 Home (64-bit)
- Bullguard Internet security 1 Year
- 2 Year Parts 3 Year Labour Warranty

£999.99



CUSTOMISE YOUR DREAM PC TODAY

WWW.FALCONCOMPUTERS.CO.UK

190-205 Roker Avenue, Sunderland, SR6 0BN

All prices correct at time of printing but may change without prior notice. All terms and conditions are subject to availability. All images are for illustrative purposes only. All trademarks are property of their respective Owners. Falcon Computers 2 Year Warranty covers PC Hardware on selected PCs. See Website for More details.



▲ If you prefer PCs to Macs, the HP Pavilion 300-235na is like a Mac Mini

Small Form Factor PCs

Apple does not have an exclusive on small form factor PCs and HP, Dell and others have them too. The Dell Inspiron 3050 Micro Desktop (dell.to/1PYZbEq) is a bit underpowered, though. It looks like a black Mac Mini and it is powered by an Intel Celeron processor J1800 that runs at up to 2.8GHz. It has just 2GB of memory and only a 32GB solid state disk drive. but one of the three USB ports is USB 3, so you could plug in an external disk to store your music, photos, videos and other files. It's low price of £199 makes it tempting and, like a Mac Mini, you add your own keyboard, mouse and monitor. HDMI and DisplayPort are supported and there are Gigabit LAN and Wi-Fi connectivity.

The HP Pavilion 300-235na Mini PC (bit.ly/1UQxZFZ) is much closer in specification and price to the Mac Mini and this £378 computer is tiny, measuring just two inches tall. It comes with 64-bit Windows 10 and is powered by a Intel Core i3-5005U CPU with Intel HD Graphics 5500. It has 4GB of RAM and a 1TB hard disk drive. It has four USB 3 ports, HDMI and DisplayPort sockets for powering a monitor or TV, Wi-Fi, Bluetooth and Gigabit LAN.

Apple MacBook Vs. Dell XPS

The popularity of laptop computers has increased enormously over the last few years and they are cheaper than they used to be, more powerful, and they are convenient. You can use them anywhere and you are not tied to a desk or table.

Apple has a range of laptops that are a popular purchase for many Mac users. The smallest of these is the MacBook, which is notable for its extreme thinness and low weight. It has a 12" screen, but the bezel around the edge is narrower than many rival laptops and so the overall size is smaller than you might expect. At its thickest point the case is only 13mm and the MacBook weighs significantly less than a kilogram. It has 8GB of memory and the base model has a 256GB solid state disk. The processor is a 1.1 GHz dual-core M processor that turbos up to 2.4 GHz.

The price of this base MacBook model is £1,049, which might at first seem expensive compared to some Windows laptops, but the Dell XPS 12 2-in-1 Laptop (dell.to/23IWFpY) is actually £100 more. It could be argued that the Dell is more innovative and the clue is in the 2-in-1 in the name. This laptop has a tear-off screen that enables it to be used as a tablet too..

The device runs Windows 10 and has a touchscreen, so you can sit on the sofa in front of the TV and use it on your lap. At 1.2kg it is just a little bit too heavy to comfortably hold in one hand. It has a processor that should offer more power than the MacBook's too, and it has a Core m5 processor that turbos to 2.8 GHz. The 4K screen with a resolution of 3840 x 2160 is higher resolution than the MacBook's.

Where Apple laptops really excel is when running on batteries. The company has some very power-efficient laptops and the MacBook will run for nine hours browsing the web, 10 hours watching movies on iTunes and will last for 30 days on standby. That is when running OS X and if you install Windows in Boot Camp on a MacBook and run Windows from startup, it does not last quite as long. The long battery life is partly due to clever hardware, but it is also helped by an operating system and applications that all work together to conserve power.

If you want a powerful and flexible innovative laptop computer that doubles up as a tablet, then there are Windows devices that beat the MacBook one way or another. If you need a laptop that runs all day on a single battery charge then the MacBook is a better option. You also have the choice of two operating systems to run.

The Verdict

You can always find a Windows PC that is similarly priced to a Mac and has similar specifications. Where the PC is limited to running Windows, the Mac can run Windows and OS X. When Windows is installed on the disk using Boot Camp you have a dual-boot system and can choose the operating system you want to run. It gives you the best of both worlds.

The Mac Mini enables you to continue using existing PC hardware or buy new non-Apple kit that could be useful if you decided to switch back to PCs at a later date, too. Macs are not for everyone and even a Mac Mini might seem expensive to people on a limited budget, but it is an option worth considering. [mm](#)



▲ The Dell XPS 12 2-in-1 Laptop is as good, if not better than a MacBook

WHAT HI-FI?
AWARDS 2015

PRODUCT OF THE YEAR

Wireless speakers

Best portable wireless speaker £100-£200

Audio Pro Addon T3

WHAT HI-FI?



Audio Pro Addon T3

November 2015

WHAT HI-FI?

TEST WINNER

Audio Pro Addon T3

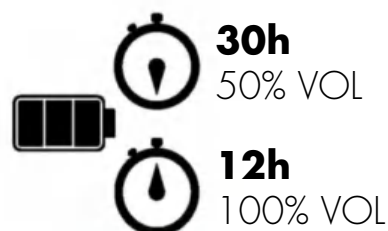
November 2015

ADDON T3

PORTABLE WIRELESS SPEAKER



**PLAY
LONGER
& LOUDER**



audio pro

SOUND OF SCANDINAVIA
www.audioprodirect.co.uk

4.0 Bluetooth

SketchUp World View

In the third part of this series, **Mark Pickavance** delves deeper into what Sketchup can do with a little perseverance



This week, I'm going to show some more advanced techniques for SketchUp and also present some real-world applications, because modelling things in 3D is a mostly academic exercise unless you have a use for the data it creates.

Along the way, I'll be revisiting the house I started with a couple of weeks ago, and I'll also be modelling somewhere much further away based on just a photograph.

But before I go there, my own modelling experiences have brought about something that I need to talk about, for anyone wanting to use SketchUp in anger: specifically, the unintended consequences of invisible geometry.

Back To Layers

I previously covered layers, though I'm happy to admit that I rather assumed at the time that layers were implemented much like they are in other modelling tools.

This assumption was wrong, because in lots of respects, I've concluded that SketchUP doesn't have layers, even if the feature and controls appear to exist in this tool.

01. To best explain this logic here are two 1 metre cubes I created, and I've put each on their own layer and turned the colours on so you can see that they're not on the same layer. I wish they'd picked nicer default colours than this, but you can change them if you wish.

02. Then using the push/pull tool, I expanded the side of one cube, extending it to touch the one alongside it using the Ctrl modifier so it left the original edge. This is very easy, because you can reference the

geometry on all layers, even if you're working on a specific one. But there's a dark side to this capability.

03. Here I've turned off the second layer and it reveals that the end of the box is not capped like you might reasonably expect. The obvious conclusion is that the two cubes aren't independent objects any longer. A hidden surface is also inside.

04. When I try to move an edge, this hypothesis is proven, because intrinsically all the geometry in SketchUp is on a single layer, and the 'layers' functionality is purely a more sophisticated way of hiding and unhiding geometry.

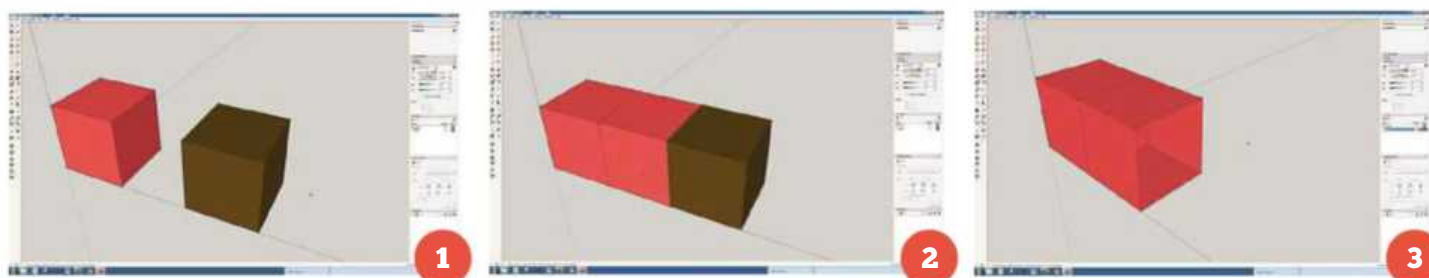
Objects unintentionally sticking together can rapidly become a problem, if you let it.

05. Luckily, there is a solution. Rewinding to before the push/pull, I've grouped the geometry in the right-hand cube and then repeated the expansion of the first object.

If I hide the second cube by switching its layer off, you can see the first box is now capped correctly. You can reference grouped geometry without getting stuck to it.

06. Repeating the edge move, it's obvious that the boxes haven't glued themselves together, though you can still reference edges, nodes and surfaces on the grouped geometry.

This is hugely significant, because if you don't realise this, all sorts of weird things start happening to your models, as intersecting lines and surfaces start being created that you hadn't intended. And when



these are with geometry on layers that are not on, these changes can happen invisibly.

The working rule I'd stick to is that you only use layers to place objects that you've grouped previously, not raw geometry. If you do this, layers should work mostly like you're expecting them too, rather than how they normally do.

I should have mentioned this earlier, but I didn't come to this conclusion until I'd been using SketchUp for a while.

Next, let's move on to making models purely from photographs.

Picture This

I've seen lots of software tools that claim to make 3D models from photos, and most of them are very ham-fisted efforts.

SketchUp doesn't claim to do this, but it does have a mechanism for helping you create models using photographs as reference. These are never going to be as accurate as ones done from physical measurements, but depending on what your objective is, they might be good enough.

07. This is a picture taken in the same housing estate as the detailed house model I've been working on. This time it's a semi across the way.

To get it into SketchUp, you import it, using the 'Match Photo' setting on the file selector. Once it comes in, you're presented with a grid and these 'dumbbells' to work with.

08. What you need to do is find parallel lines on the image that you can line the dumbbell lines up with by dragging the boxes at either end. To help in this, you can zoom in, to get the perfect spot. Green lines should be on the right-hand side of the building, and red on the left. You need a picture that shows two sides, obviously.

09. With the dumbbells in place, you need to do two other things, the first of which is the position the origin. Drag that to the nearest corner of the building or some reference point you can easily see. I picked the nearby edge. All we need to do now is define the scale.

10. I know from experience that a line of bricks (and mortar) is 75mm high, so by multiplication I know that ten brick courses are 75cm or .75m. This information can be put into the 'Match Photo' tab and then the blue axis can be dragged up and down until the green dotted lines are at ten brick course intervals.

11. After pressing 'Done', you're ready to model. You start from the origin and start making lines that define your first side. Never just draw a line in space, because it has no depth reference there, and will not be on the same plain. Here I created a box and then used the centre of the top side to draw a line up to where the roof is.

12. If you want to rotate back to the photo for more reference points, then just double-click the picture in the 'Scenes' tab, and it will return there and place the image over the model. Very soon, I had the end of the house and was ready to start pushing along the other axis of the house. To do this, I removed the internal lines.

13. After a push/pull using the picture to determine how much, I started work on the entrance hall. To get this on the gable end, I referenced the bottom edge and used the photo to give me the height and green axis positioning. Modelling like this is a combination of drawing what you see and then what you know to be true.

14. My intention here was to produce a very simple model of roughly the right size and shape, but you can add extra detail very easily. Here I've highlighted the left-hand wall of the house and then on the right-click menu I've selected 'Project Photo'. This takes the imagery from the photo and uses it to paint the chosen surface.

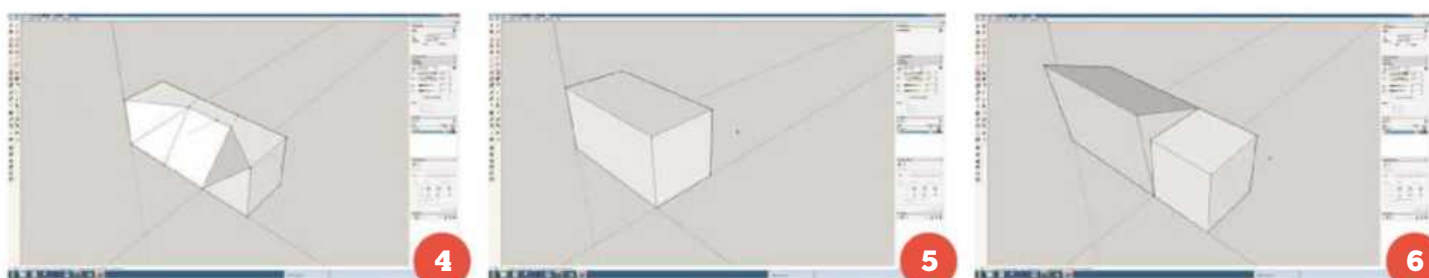
15. It looks rather good, and you can select any surface, and the image will be rendered for that too. The snag, as is hinted at by the white triangle beyond the entrance to the left, is that it can't paint places if it has no idea what they look like.

What we really need is another image to fill those areas that aren't in the first image.

16. I've rotated around the model to show some sides where there's no photo reference. If you right-click these faces you get a new option: 'Add Photo Texture'. Selecting this will take you to what is effectively a spawned version of Google Street View.

What you'll need to do is put in the address and then find a good view in that road.

17. With the right view found, the system gives you a bounding box for defining what part of the image you'd like mapped. Obviously, there's some guesswork involved here, and the images were taken at a different time of day to my reference photo. An alternative would be to start with multiple photo match images if you have them.





7



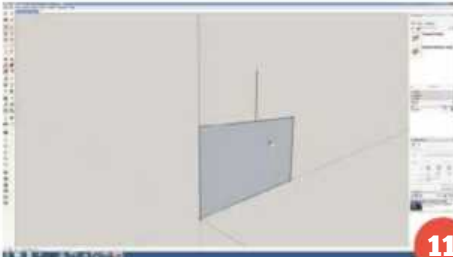
8



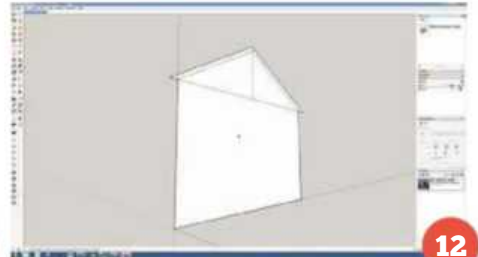
9



10



11



12

18. The image is mapped onto the gable. Not great, but fine for this project. If done well, I could use the texture to model that window, I guess.

Depending on the angle, the results vary, which is my way of explaining how bad the roof looks, given that it was generated from a very narrow slice of the image.

Ground Force

Making a simple model from images is fun, but how about we place it in context? By that I mean that we give it an actual geographic location, rather than it just being disconnected geometry. SketchUp can do that, and actually more.

19. On the File Menu is an option called 'Geo-Location', and you can 'add location'. This then brings up a window with what looks like Google Earth. You can then choose where in the world you'd like and bound exactly the right bit. Once you click Done, that geolocation and the satellite image is copied into SketchUp.

20. I should mention that the image it presents is a screen grab, so I advise you to make the selection window as big as possible, to get the best quality.

By default, the area is centred on the axis, and it's entirely flat, even if the terrain isn't. The geolocation menu has an option 'Show terrain' that will fix that.

21. Now you can see that this street is on a general slope going from east to west, and you get contour this, by making stacked blocks and then asking for model intersections to be created. But I'm not interested in doing that today. Instead I want to place the house on to the terrain in the correct location.

22. I import the house and by default it's placed where its origin would place it, which in this case is in the middle of the map. What looks good is that the scale is right, so my brick size calculation worked. I tested this model against the other house and, amazingly, they only differed by 2cm in height.

23. I rotated the house, and then took the origin point and placed it on the surface of the terrain. Luckily for me, that corner is visible in the terrain image, as the satellite was not directly overhead. This, however, makes the roof appear to extend beyond the gable on the ground. Don't assume that this means the model is wrong; it isn't.



13



14



15



16



17



18

YOUR UNIVERSE



POWERED BY *Archer*



Archer C2600 - Wireless Dual Band Gigabit Router

- ⊗ Omni-directional wireless coverage with beamforming technology
- ⊗ A powerful 1.4GHz dual-core processor
- ⊗ 4x 10/100/1000Mbps LAN Ports
1x 10/100/1000Mbps WAN Port
2x USB 3.0 Ports
- ⊗ Dual band Wi-Fi 2.4GHz (800Mbps) and 5GHz (1733Mbps)
- ⊗ TP-LINK Tether iOS and Android App
- ⊗ Run Multiple Devices Simultaneously with MU-MIMO technology

amazon.com

box.com

ECL

dabs.com

ebuyer.com

OVERCLOCKERS UK

SCAN



Proud Sponsors of
team-dignitas



/TPLINKUK



/TPLINKUK



/TPLINKTECH

uk.tp-link.com



24. I've rotated the camera so it's roughly in line with the angle that the satellite looked down. The house now correctly obscures the image of the roof on the terrain. This estate probably only uses six different house styles, and mirror versions, so I could model the whole thing with a day or so spare.

Greater Complications

After the simple house build, I wondered if it would be possible to create something more elaborate based purely on 2D images. I scoured the internet looking for something suitable, and finally came up with this building in London.

25. This is near the Old Bailey, and is currently occupied by Santander, but it looks like it had a much grander past that warranted this wonderful elegant architecture.

What it also had was a picture taken of a corner in good quality, and some people in the foreground to provide relative scale.

26. Just 30 minutes in, and this is already starting to look quite impressive. This was possible only by working from the origin and only building on geometry that was connected back to their. As you can see, I added lots of construction guides, because these can help you make the model parts join up when you can't see the intersections.

27. I realise now I'd already made a major mistake, in that I actually created both sides of this corner structure. Rather than building one side and then copying the geometry through a 90° rotation.

I also should have realised that all the windows and facias were symmetrical, so some dimensions were defined for me without guesswork.

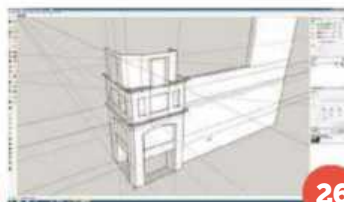
28. However, the big problem I eventually discovered was the limitation of using a single image – specifically, how you can wrongly interpret what you see from one direction. I convinced myself this structure on the very top of the building was set back from the main body, as its connection was obscured.

29. As a result, I drew this structure on top, which fitted perfectly with the photo image. Orbiting the model, it just didn't look right, because everything else about this design looked so particular, and this looks like an afterthought. What I really needed was another perspective to reveal the geometrical truth.

30. Google Earth has these automatically generated buildings these days, but they're good enough to show me the errors in my assumptions. Not only had I got the whole top of the building wrong, but I made some fundamental mistakes elsewhere.

The moral of this tale is to get more than one image, for any project like this.

31. This is a Google Street View image from 'Limeburner Lane' that I used to make my model information. The only problem with using Street View is that sometimes the image is stitched together, blending two different perspectives.





33

Avoid these images if you can, as they'll mess up the model if you follow them exactly.

32. The point I logically decided to end this exercise. There's probably four or five hours of work in this, but lots of time got wasted fixing geometry assumptions that turned out to be wrong. I only really used line, box and 'follow me', along with copious guides to create this. And it was made from a location I'm not familiar with and can't physically measure.

The House Continued (images 33 -42)

In the previous two tutorials, I've been working on a detailed house, so I thought I'd finish this week with a quick look at where I got to with that project.

If you haven't read those, I built a detailed model of a house using physical measurements and the powers of SketchUp. I did this because I didn't think using photo match would be accurate enough, though possibly I might reassess that now. Just as an exercise I decided to use a photo match and see how it compared with the model I'd already constructed.

As you can see from these pictures, this turned out to be a very worthwhile exercise. While most of the house was affirmed by the photo match, one part was very obviously wrong. For some reason, I'd measured the front window as being 206cm wide, when it was in fact 226cm.

This was a quick fix, and I was really pleased that by doing this I'd picked up a very significant mistake. I was also delighted with how the rest of the house fitted, suggesting that my measurements elsewhere were spot on.

The major work I've done on the house is the addition of a roof, which I created by modelling a roof tile and then replicating it to cover the house. What is fascinating about this exercise is that



34

you begin to realise how much of construction is based on loose tolerances, and how the house is essentially bodged to look right, rather than actually be correct.

As such, the overhang on the roof isn't even, because the tolerances of laying bricks is much greater than laying tiles, which have no cement between them.

Another complication to getting the tiles in place was that while making trays of them for application, I noticed that the step connections between them entirely altered the pitch of the roof. So I actually added a small piece of geometry to give me a pitch offset that I could then rotate to 30 degrees to get the tiles laid at the right angle.

In retrospect the roof is probably overkill, but it was either that or not really model it at all.

There is, however, one limit to this construction, which is the cement filling that is used on the ends to hide the hole between tiles and house. I could have actually created a super elaborate intersection model for this part, but I decided to just let the geometry overlap instead.

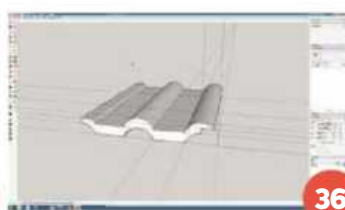
Another time-saving exercise was that I got door handles from the 3D Warehouse rather than actually modelling my own. The ones I found are actually quite close to those in the house and look fine.

Final Thoughts (images 43 -47)

I've been modelling with SketchUp for about a month, and finally the pennies have started to drop for me. The speed at which I can create geometry has significantly improved, as have my choices about the best approach to making things. The use of grouping and components has drastically reduced mistakes, and I now feel confident enough to try out quite advanced modelling techniques without getting lost along the way.



35



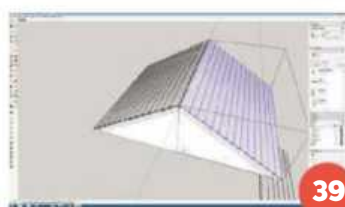
36



37



38



39



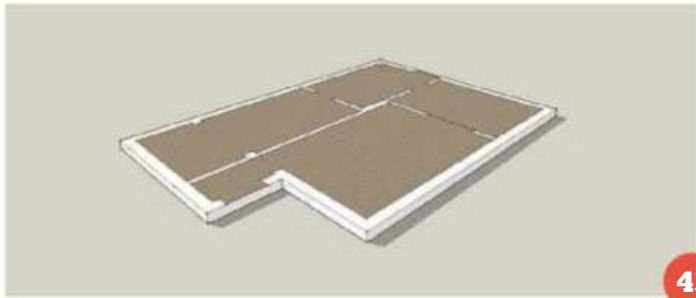
40



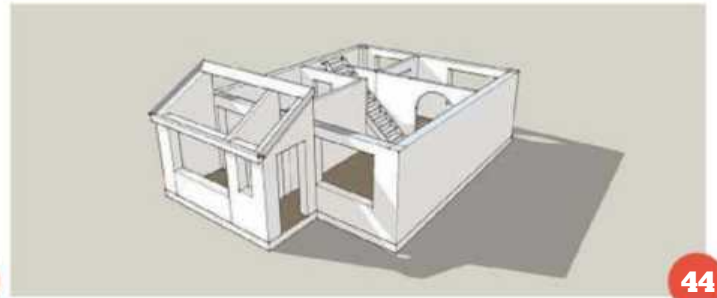
41



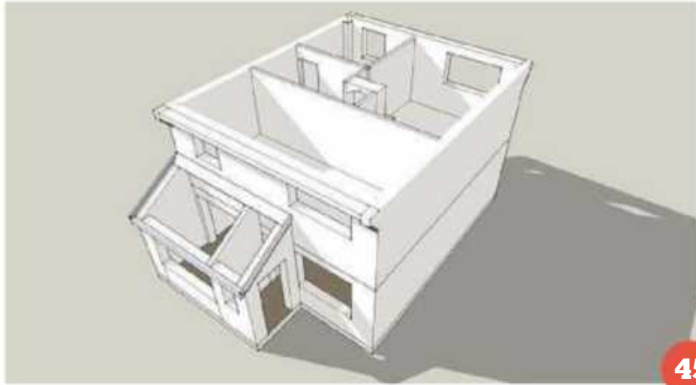
42



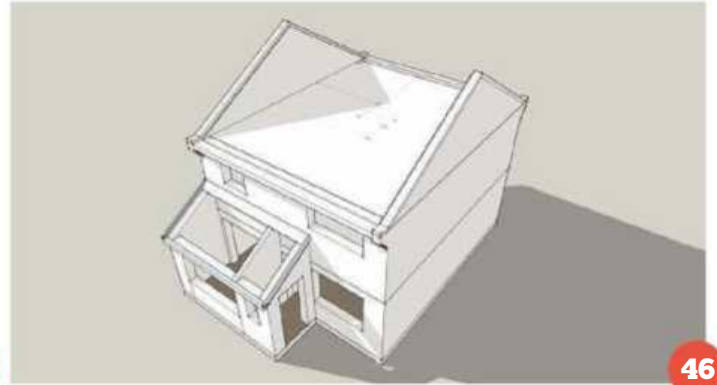
43



44



45



46

Learning the key presses for smoothly moving between selection, erase and line is absolutely critical if you ever want to work quickly, I've determined.

However, as far as I've got, there's much further to go. I still haven't explored dynamic objects or very many of the sophisticated extensions, and I haven't even looked at 'Ruby', the coding side of this software.

The phase I'm in at this moment is getting a refresher on how enjoyable and rewarding modelling in 3D can be, and you can also make some very useful things, even if you don't have a 3D printer to output them. For example, my house model can tell me in a couple of clicks the surface area of the walls

in any room or exactly how much carpet I'd need for a refurb. But it could also prove very useful if I ever decided to have an extension built and wanted to know how it would look in situ or how much space it would add to the existing layout.

I've still got plenty of work to do on the house model, like finishing the internal walls, adding roof trusses and filling it with furniture.

What I've learned doing it so far is as much about SketchUp as it is about how things are made by builders, and that's an education in itself.

Have fun modelling, whatever project you decide to take on. [mm](#)



47

Shop the it Tablet family now...

Quad-core tablets from £44

Beneath the crystal-clear display, there's a powerful quad-core processor that's designed to deliver smooth performance, irrespective of whether you're browsing the web, or playing a game.

Visit www.ittablet.co.uk to shop now!

Managed and delivered by our partners at



*No.1 best seller on Amazon UK



Proud to support
Bliss
for babies born too soon,
too small, too sick



Want to know more?

tel. 0871 571 2201

visit www.ittablet.co.uk

twitter.com/ittablet facebook.com/ittablet

SUBSCRIBE NOW!



Subscribe to **micro mart** today and save on the single issue price.

Each issue of **Micro Mart** will be delivered directly to your device each week.

SEE NEXT PAGE FOR SET-UP INSTRUCTIONS

▶ HOW TO SUBSCRIBE...

...on an iPad or iPhone

- STEP 1** Return to the **Micro Mart library**
- STEP 2** Choose your subscription term and tap twice on the 'price' box
- STEP 3** Choose whether to create an optional **PixelMags** account
- STEP 4** Enter your **Apple ID password** to confirm



...on a Kindle Fire

Kindle Fire subscriptions come with a **FREE** one month trial.

- STEP 1** Tap '**Free Trial Subscription**' in the **Micro Mart library**
- STEP 2** Chose your subscription term from the drop down menu on the popup that appears
- STEP 3** Tap '**Subscribe**'



...via the app

- STEP 1** Search for **Micro Mart** via the search box in the **Shop tab**
- STEP 2** Tap the '**Subscribe**' button
- STEP 3** Choose whether to create an optional  account
- STEP 4** Enter your **Apple ID password** to confirm



**Subscribe to Micro Mart today and
save on the single issue price**

Component Watch

If 4K seems like overkill, there are other better-than-HD monitor options out there...

4K monitors are getting more affordable, but they are still quite expensive in comparison to older technology. However, if you want something better than a HD screen, you could opt for a 2560 x 1440 screen. Technically known as WQHD, or Wide Quad HD. It has four times as many pixels as a 720p video screen, hence the name. These monitors are still expensive, but not punishingly so – and opting for slightly less pixel density means you money can go on other features too if you prefer. In this week's Component Watch, we've found the best deals on WQHD screens so you can see what's out there.

Deal 1: Asus VX24AH

RRP: £282 / Deal Price: £199

This nigh-on 24" gaming monitor has dual HDMI and D-Sub inputs, a frameless design and built-in speakers for a high-quality gaming experience. There's also an additional VGA input for older hardware, an earphone jack and a number of different settings to tailor the display to your personal taste – including a special 'low-blue' mode for night time use (it's meant to reduce disruption to sleep). Reduced in price by almost £100, it's a great all-in-one package for anyone who wants a larger, more precise screen.

Where to get it: Scan (bit.ly/1LHtgkd)



Deal 2: BenQ BL2420PT

RRP: £282 / Deal Price: £223

The BenQ BL2420PT is an IPS screen with 5ms response time, the same 'low-blue' mode as the Asus screen, time and a special CAD/CAM mode aimed at designers and professionals – amongst a host of other features. Inputs include a VGA port, HDMI port, DisplayPort and DVI-DL port, and there are also built-in speakers. Its flicker-free design would appear to make it great for those who need a precision all-in-one work solution, while – also advantageous to those who have to sit at screens for a long time – the fully adjustable base means you'll never have to end the day with a sore neck again. The fact that it's currently on sale at with £60 off is just another reason to recommend it.

Where to get it: Ballicom International (bit.ly/1RpJpzz)



Deal 3: AOC Q2577PWQ

RRP: £265 / Deal Price: £214

This 25" screen has an inch on most of the others at its price point, and that makes it an intriguing prospect – especially since it's not that expensive. Again, it has VGA, DVI, HDMI and DisplayPort inputs, and again there are built-in speakers. But that extra inch is what makes it worth thinking about, even if it means a slightly lower pixel density.

AOC might not be the most well-known name in monitors, but it's high quality enough to be worth paying this amount of money for especially if you want a high-res, high-real estate screen.

Where to get it: CCL (bit.ly/1QzTaYK)



Deal 4: Asus PB258Q

RRP: £330 / Deal Price: £255

At the high end of pricing, this Asus has greater fidelity thanks to its high-end panel, image accuracy enhancements and 'SplendidPlus' video intelligence technology. Again, there's a 'low-blue' mode and a low power mode for energy saving. Ports include HDMI, D-Sub, DisplayPort and Dual-Link DVI-D so you won't struggle to connect it. Best of all, it's wall-mountable – the stand snaps right off when you need it to.

Where to get it: Scan (bit.ly/1T96HNQ)



Deal 5: Dell U2515h

RRP: £275 / Deal Price: £250

Dell's monitors are high quality, and this ultrawide IPS is a great all-rounder. Height-adjustable and wall-mountable, it's got Dell's reliability and eco-efficiency enhancements – plus a 6ms response time. There's also a three-year limited hardware warranty and three-year exchange service, so if anything goes wrong there'll be a replacement with you shortly. In addition to dual HDMI, DisplayPort and Mini-Displayport connections, it's got a five-port USB hub, one of which can be used for charging.

Where to get it: Laptops Direct (bit.ly/1QzTsyN)



FROM EVERYDAY TASKS TO EVERY GAMER'S DREAM

www.meshcomputers.com

mesh
award winning PCs • 1987

You can follow us on:



MONEY OFF DEALS
GO ONLINE FOR MESH OFFERS



*"One of the most
powerful mini PCs
we've ever seen."*



Voyager Mini CS

£999

Inc. VAT & Free Delivery



- Intel® Core™ i7 6700K Processor
- ASUS Pro Gaming Z170I - Mini ITX Skylake Motherboard
- 4GB NVIDIA GTX 970 graphics card
- Fast 16GB DDR4 3000MHz Memory
- 250GB M.2 Solid State Drive
- 1TB SATA 3 Hard Drive
- Fractal Design Node 304 Case
- Microsoft Windows® 10 Home
- Lifetime Gold Warranty*



Includes Free
Game Bundle
Tom Clancy's
The Division



Elite Inspire

£429

Inc. VAT & Free Delivery

- Intel® Core™ i5 6400 Processor
- ASUS H110M-A Skylake Motherboard
- Integrated Intel® Full HD graphics
- Fast 8GB DDR4 2400MHz Memory
- 1TB Seagate Barracuda Hard Drive
- Thermaltake Versa H21 Midi Case
- Microsoft Windows® 10 Home
- Lifetime Gold Warranty*



Elite Azuri

£1299

Inc. VAT & Free Delivery



- Intel® Core™ i7 6700K Processor
- ASUS Z170-K Gaming Motherboard
- 4GB NVIDIA GTX 980 graphics card
- Fast 16GB DDR4 2400MHz Memory
- 2TB Seagate Barracuda Hard Drive
- 240GB Solid State Drive
- INWIN 805C Black Aluminium Tower Case
- Microsoft Windows® 10 Home
- Lifetime Gold Warranty*
- Free ASUS Cerberus Headset



Includes Free Game Bundle
Tom Clancy's The Division



15.6" X553MA | £299

Inc. VAT & Free Delivery

£15 OFF
USING VOUCHER
CODE AD15

- Intel® Dual Core™ N2840 Processor
- 15.6" LED backlight Display
- Intel® HD Graphics
- 4GB DDR3 Memory
- 1TB Hard Drive
- Super Multi DVD RW Optical Drive
- Integrated Sound System
- Wireless 10/100 Ethernet
- Bluetooth 4.0
- Microsoft Windows® 10 Home



17.3" GP72 Skylake-i7 | £849

Inc. VAT & Free Delivery

£20 OFF
USING VOUCHER
CODE AD20

- Intel® Core™ i7-6700HQ Processor
- 17.3" LED Full HD (1920x1080)
- 2GB NVIDIA 950M Graphics
- 16GB DDR4 2133MHz Memory
- 1TB 7200rpm Hard Drive
- Super Multi DVD RW Optical Drive
- Integrated HD Webcam, SD Card Reader
- Wireless 10/100/1000 Gigabit LAN
- Bluetooth 4.0, 4x USB, HDMI
- Up to 5 Hours Battery Life
- Microsoft Windows® 10 Home



✉ sales@meshcomputers ☎ 020 8955 0731 🌐 www.meshcomputers.com

0% FINANCE - BUY NOW, PAY FEB 2017

Terms and
conditions apply

Now Accepting
PayPal

Please Read: Sales subject to terms & conditions (copy available on our website). Advert does not form part of a contract. Pictures shown for illustration purposes only - colours may vary. Full specifications available online. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries. All trademarks are acknowledged. At Mesh our PCs are custom built, fully burn-tested with professional CPU overclocking options - Free overclock configuration is available for an unlocked CPU and when a liquid CPU cooler is selected. 0% Finance - Pay 10% deposit, and pay the rest off within 12 months and pay no interest. *Lifetime Gold Warranty - Lifetime Labour, 2 Year Parts, 1 Year Free Collect & Return. Sales line open Monday - Friday 9am - 6pm. Online ordering 24x7. Prices and specification correct at time of going to press on 19/2/16. E&OE.



Hitman And Division Tie-Ins

McAfee: I'll Hack The iPhone For Free

"Cybersecurity legend" offers his services to the FBI

It won't have passed you by that Apple has been in a very public discussion with the FBI over access to an iPhone linked to the San Bernardino attack last year. While Tim Cook issued reasons as to why the company wouldn't give the FBI what it wanted, John McAfee took the opportunity to promote his own credentials.

McAfee wrote a lengthy, impassioned plea at *Business Insider* for the FBI to allow him and his team to decrypt the information on the phone, for free. Here are some choice extracts from his 'offer'.

"With all due respect to Tim Cook and Apple, I work with a team of the best hackers on the planet... I would eat my shoe... if we could not break the encryption on the San Bernardino phone. This is a pure and simple fact... If you doubt my credentials, Google 'cybersecurity legend'

and see whose name is the only name that appears in the first 10 results out of more than a quarter of a million."

You got to give him this, at least; McAfee sure is a confident chap. We'd be very surprised if the FBI does take him up on his offer, however.

Also on the Apple-FBI face-off, there are plenty of opinions doing the rounds. The Donald (or Donald Trump, to most of us) has told his supporters to boycott Apple until it agrees to comply with the US government, telling people at one of his rallies "What I think you ought to do is boycott Apple until they give that security number."

Mark Zuckerberg is reportedly "sympathetic" to Apple's position while Bill Gates has said he thinks Apple should co-operate given that it's a very particular information request.

The case rumbles on.



Overclockers provides the PCs

Overclockers UK has introduced a new section to its website – PCs by Game. A way of marketing gaming PCs around various AAA titles, the range has been launched with a nod to *Hitman* and *Tom Clancy's The Division* with two systems focused on each title. So, that's the Titan Contract "Hitman" Gaming PC and the Titan Agent 47 "Hitman" Gaming PC, alongside the Titan Pandemic "The

Division" Gaming PC and the Titan Dark Zone "The Division" Gaming PC.

Both of the Hitman-inspired PCs come with the R9 380X and R9 390X graphics cards for maximum frame rates and "extreme performance" and will be sent out with a free copy of the title to boot. The systems nodding to Tom Clancy are equipped with GTX 970 or GTX 980Ti cards and again ship with the title.

The prices starting at £870, and you can head over to www.overclockers.co.uk for more details.



It's amazing how quickly drones are improving. We're now at the point where these low-powered flying machines are given to children as toys, and almost professional level devices can be picked up fairly cheaply too.

That's great, and they're a lot of fun, but the potential for abuse makes them a scary prospect too. Not only do we have to worry about people using them to spy on others, we also have to think about safety concerns. Even the most innocent of pilots is capable of doing some damage if they lose control of their drone and crash it into a building, a vehicle or even directly into a person.

Of course, there is legislation that regulates the use of drones, but with their increasing popularity and sophistication, surely it won't be long before more dedicated and detailed laws are needed.

Still, common sense goes a long way, so if you're buying a drone, then there's no reason why you can't have fun.

Anthony

Editor

Master Of Orion Early Access

Voice cast is impressive

The critically-acclaimed Sci-Fi turn-based strategy title, *Master of Orion* is to be reborn courtesy of Argentina-based NGD Studios, which has decided to reboot the 1993 game.

The aim here is intergalactic domination, with players taking control of one of ten playable races competing across space. No two games are ever the same as there are hundreds of unique technologies, dozens of ships and thousands of galaxies – which you can explore for yourselves when the game comes to Steam early access on February 26th.

A huge part of any gaming experience is the audio and, in particular, the voice cast. In this case, the developers have really excelled themselves bringing, among many others from the

Sci-Fi genre, Mark Hamill, Robert Englund, Nolan North, Troy Baker and Dwight Shultz on board.

The Collector's Edition of the new game can be bought via www.masteroforion.eu.



Meanwhile... On The Internet...

The line walked by so-called 'white hat' hackers (tinyurl.com/MMnet03a) is a thin one. Essentially poachers-turned-nicer-poachers, they look for vulnerabilities in systems so that they can reveal them to companies and eventually the wider public, in the hope they find them before they're exploited by nefarious 'black hats' (tinyurl.com/MMnet03b).

Cyber-vigilantism is still vigilantism, though, and brings with it the same conundrums: is acting criminally to 'do the right thing' morally defensible, and where are the lines drawn?

Take for example, the recent VTech hack (tinyurl.com/MMnet03c). There, an individual hacked the toy company's Learning Lodge service before passing details of what he had done to *Motherboard*. Despite there being no evidence that any of the haul of 4.8m customer account details (tinyurl.com/MMnet03d) and other personal information – pertaining to over six million children (tinyurl.com/MMnet03e) – made its way to the darker realms of the internet, the whistle-blower will have to plead his case in court after being arrested.

Which, in a roundabout way, brings us to the events surrounding uKnowKids (www.uknowkids.com), which specialises in producing monitoring software allowing parents to track what their kids are up to online, and even their physical location via their mobile devices. It hit the headlines last week, however, after a blog post by MacKeeper Security Researcher Chris Vickery spilled the beans on an amazingly vulnerable cache of sensitive information he'd managed to grab from the company (tinyurl.com/MMnet03f) – and the reaction of the firm's CEO, Steve Woda, to what he'd found.

According to the blog, Vickery discovered that "one of the uKnowKids databases was configured for public access, requiring no level of authentication or password and providing no protection at all for this data" before exploiting the misconfigured MongoDB (tinyurl.com/MMnet03g) installation to grab details on over 1,700 children (tinyurl.com/MMnet03h). His haul included "first and last names, email addresses, dates of birth, GPS coordinates, social media access credentials, and more"; basically, a motherlode of data that's enough to make any parent shudder. Apparently, what's worse is that the database could have been sitting there unprotected for months.

From a security standpoint, it's a mess – and, PR-wise, uKnowKids haven't fared much better. Its reaction, which came in the form of a blog post from Woda (tinyurl.com/MMnet03i), makes extensive use of quote marks around "security researcher" and other terms relating to Vickery's role, and illustrates the suspicion under which he is held. That's despite his track record as a white hat, and the fact that – unlike our VTech pwning friend – he contacted the firm a mere 12 minutes after he bagged its data. It would seem, though, that Woda's aggressive attitude – perhaps in the hope of suppressing the story – has ended up awakening the Spirit Of Barbara Streisand once more (tinyurl.com/MMnet03j). Good ol' Babs.

Sometimes, y'know... you're just on a roll – and when you're hot, you're hot... Just ask the folks behind the NSFW (a bit like the links that follow) isthisshowyougoviral YouTube channel (tinyurl.com/MMnet03k). Though it's a formula it appears to have hit upon as far back as 2012 (tinyurl.com/MMnet03l), and that's been doing the rounds on the internet for the best part of a decade (tinyurl.com/MMnet03m), its rap/kids TV mash-ups have hit a new level in the last fortnight or so.

First came a glorious Barney/Notorious B.I.G. blend (tinyurl.com/MMnet03n), followed by video setting Ice Cube's stone-cold-classic *It Was A Good Day* – a long established meme in its own right (tinyurl.com/MMnet03o) – as a soundtrack to footage from 90s animation *Doug*... and if that isn't something to prick our nostalgia nerve, we don't know what is.

Let it be said, though, that the pinnacle of this particular genre remains that stellar work of YouTuber AnimalRobot, aka Benjamin Roberts (tinyurl.com/MMnet03p), who came up with the classic *Dinosaurs/Hypnotize* clip (tinyurl.com/MMnet03q) clip, that was so succesful that it got the tune back in the US Charts (tinyurl.com/MMnet03r).

When Blake Benthall was arrested as the main man behind Silk Road 2.0 (tinyurl.com/MMnet03s), and several dark web markets were bought down as part of the wider Operation Onymous in November 2014 (tinyurl.com/MMnet03t), right from the start the implication was that law enforcement had found a way to identify the IP addresses of Tor network users.

To be more precise, it was claimed – by none-other than those behind Tor itself (tinyurl.com/MMnet03u) – that staff at Carnegie Mellon University were responsible (tinyurl.com/MMnet03v), as part of a deal with the FBI worth at least \$1m. Court documents released late last year gave some credence to the accusation (tinyurl.com/MMnet03w), revealing that a "university-based research institute" had given the FBI a number of IP addresses pertaining to various online markets and those behind them. Now, the same case – that of alleged Silk Road 2.0 second-in-command, Brian Farrell (aka DoctorClu) – has coughed up more details (tinyurl.com/MMnet03x).

The long and the short of it is that Carnegie Mellon did hand over the addresses central to the SR2.0 and Onymous arrests (tinyurl.com/MMnet03y), but it wasn't directly paid by the FBI. It's research into Tor was, in fact, being funded by another branch of the US Federal government, the Department Of Defense, but when the FBI found out about it – it's unclear how – it subpoenaed the group, forcing it to hand over its findings.

Interestingly, as part of the same motion, the judge also concluded that Tor users have no right to expect their IP addresses to be secret, as they willingly broadcast them to the service's nodes (tinyurl.com/MMnet03z).

.AVWhy?

Videos For Your Eyes...
Not Necessarily For Your Brain

It's becoming increasingly obvious that the staff of Google-backed company Boston Dynamics simply haven't seen the amount of harrowing dystopian sci-fi that the rest of us have. If they had, there is no way they would allow the company to create anything like the Atlas robot (tinyurl.com/MMnet03aa), which features in this video. More worrying than the fact that this eerily anthropomorphic exists, is the way it is treated by the firm's employee during the various demonstrations in this video. We'd suggest that if you want to ensure that homicidal robots become a thing, hitting them with hockey sticks and poles is a really good way to go about it.



Caption Competition

"Obviously he had set his router to send larger data packets!"



This chap was the subject of issue 1401's caption competition, and here are you best suggestions...

- **JayCeeDee:** "Amazon's gift wrap service exceeds its customer's expectations!"
- **gregb49:** "Arnold was already regretting ordering the totally complete peripheral kit for the Raspberry Pi Zero."
- **Ondrive:** "Thanks for the help, Bob, but I said I was looking for just the right GIF."
- **PlaneMan:** "Bob misunderstood what the woman on Tinder ment when she said 'I hope you've got a large package' when they agreed to meet."
- **doctoryorkie:** "Bored MM staffers go 'shopping'."
- **BullStuff:** "Henry began to wonder if this really was the SFF PC he had ordered from shiftypcs.com."
- **Think Tank:** "No wonder windows phones are not selling with packaging like that."
- **Mad Malc is back:** "He bought this from a Ratners sale years ago, the ring's not that big, but it comes with full PPE in case the stone falls out."
- **ZEDSinBED:** "Amazon employee retires, but asked to deliver one last package before he goes."
- **Frank Everett:** "The packaging for new mobile phones is starting to get a bit out of hand."
- **Thomas Turnbull:** "The new Apple device is still under wraps it seems."

Thanks for all your entries, always and congratulations to our winner, **pesukarhu** with "Obviously he had set his router to send larger data packets!"

If you have something to say about the picture below (come on, you must have), head to the 'Other Stuff' section of our forum (forum.micromart.co.uk), or email us your funnies via caption@micromart.co.uk, remembering to add the issue number to the email.



Tales From The Borderlands On Disc?

Yes, please

2 K Games, Telltale Games and Gearbox Software have announced that their acclaimed *Tales From The Borderlands* game is coming to disc format this

spring; April 22nd, to be precise. It's picked up some praise in its episodic form and it's coming to PC and consoles following its digital success.

Read up on this over at www.telltalegames.com.

Apple Fixes Error 53

Third party issue resolved

Apple has released a software fix for users who were impacted by the now-infamous 'Error 53', an issue that had left many iPhone handsets stuck on the 'Connect to iTunes' screen.

The problem affected handsets' home buttons that had been replaced by a third party rather than Apple itself. The Touch ID fingerprint

reader is the root of the problem, effectively causing an iOS update to detect a non-standard component before going on to shut down the user's device.

From Apple's perspective, its position was that Error 53 was protecting a device from fraudulent fingerprint access. It has acted on this by issuing a fix for the error and referring to it as a "factory test".

Snippets!

Ear Is Sony's Siri

Another big reveal at the Mobile World Congress was Sony's Xperia Ear, a wireless earpiece providing the user with information on appointments, news, the weather and so on. Responding to verbal commands, users can ask it to make a call, dictate a message, navigate to a certain location – this is very much the kind of future tech Hollywood has been feeding us for years.

Connecting to an Android phone via NFC or Bluetooth, it's customisable, lightweight and "built for continuous wear". Having a smartphone PA without having to hold the actual phone is really rather nifty.

Wait For S7 Savings

Samsung's Galaxy S7 is clearly going to be popular among mobile users. However, if you're prepared to wait a few months you'll likely be saving yourself a bit of money when you do buy one. According to research from product price comparison site **idealo.co.uk** based on the "price evolution" of previous Galaxy models, the site is predicting that the Galaxy S7 will be as much as 21% cheaper within merely three months of its launch. Wait six months and you could save 28% off compared with the initial launch price.

Fallout Is DICE's Fave

Congratulations to Bethesda for bagging the 2015 Game of the Year prize at the 19th DICE Awards. The shooter actually won no less than three awards including the big one, with *Star Wars: Battlefront* and *The Witcher 3: Wild Hunt* faring okay too. We're also quite pleased that the quite wonderful *Rocket League* won the Sports Game of the Year prize – makes a nice change from all the continuous talk about FIFA.

New Spectrum Announced

Vega makers go portable

Retro Computers Limited, the Luton-based company behind the Sinclair ZX Spectrum Vega, has unveiled its latest project. It's a follow-up, so the title of the Sinclair ZX Spectrum Vega+ makes a lot of sense. As for the product itself, it's a handheld games console containing over 1,000 licensed games and it can also connect to a television. Much like its predecessor, it's dependent on our backing via crowdfunding platform Indiegogo.

Unsurprisingly, the £100,000 target was reached well within the goal time limit with well over 2,500 backers the last time we looked. The Vega+ will include a Micro SD slot, composite video output, a headphone socket, volume buttons on the top and the design comes from a team led by former ZX Spectrum games developer Chris Smith.

The console looks not entirely unlike a PS Vita, truth be told, but looking at the concept design here, we're looking forward to seeing this one land. If you want to back it, there's plenty of time to do so and you could be the proud owner of a £100 Vega+ when it's delivered in September. Go to Indiegogo for more details.



HTC's Vive Quite Expensive

That would be 800 of your American dollars, please

Erm, who guessed it would be quite THIS expensive. The Mobile World Congress has gone through its annual gears and among those present and correct was HTC. Its big reveal was its virtual reality headgear, *Vive*, and it turns out that it's going to cost you a whole lot of money if you really, really want one.

Specifically, the US price is \$799 and buyers can pre-order it now to see what all the fuss is about when it's available in April. Of course, the *Vive* has been a wee bit delayed since the initial expectation that it would be out in 2015, and with Facebook's own Oculus Rift due to be some \$200 cheaper, it may take some convincing to get people on board with HTC's effort.

So what does \$799 buy you? Well, a couple of controllers and two bundled games bundled means that you can at least use this one out of the box. Good job, really; once you've shelled out for this you're not going to be doing anything for a while.



Valve Provides Vive System Test

Can your PC handle it?

Now that you can pre-order a Vive headset you might want to know whether or not your current system can really cope with the demands your new virtual reality world will be putting on it. Valve has thought of this very issue, releasing a SteamVR Performance Test Tool for users to run on their systems to first check whether or not they are sufficiently kitted out.

According to Valve, the test "measures your system's rendering power using a two-minute sequence from

Valve's *Aperture Robot Repair* VR demo." With the relevant data collected, the tool then works out whether your PC can run VR content at 90fps and whether the VR content "can tune the visual fidelity up to the recommended level". If your system isn't up to the task, the test will help you to find out whether your problem lies in the graphics card, processor or both.

If you think you have somewhere north of £550 to spend on the Vive, you might want to head to store. **steampowered.com** first and download this test.

Huawei Launches Its First Windows 10 Tablet

Device wants to be your "Mate"

The Matebook isn't a particularly great name for a tablet. That fact hasn't stopped Huawei from using the dodgy nomenclature for its first Windows 10 tablet, however.

The 12" 2-in-1 device is a very thin, stylish looking affair featuring a screen resolution of 2160 x 1440 and a 160° wide angle. Battery life promises up to nine hours of work, nine straight hours of web use and 29 hours of music playback, while the 6th-gen Intel Core

m-series processor, up to 8GB LPDDR3 memory and a solid-state hard drive with capacity up to 512GB provide the performance. This, then, is effectively putting itself up against the iPad Pro and Surface Pro devices.

Like those devices, the MateBook can also be used with the MatePen stylus, which promises "2,048 levels of sensitivity", a laser point and zero delay. While there is no UK pricing detail as yet, the website for more information is, unsurprisingly, **huawei.com**.

Live Streaming Software From Magix

Twitch, YouTubers – step this way

Multimedia software outfit Magix has released a live streaming software package, Youcast. Described as "the simplest" software for gamers, musicians and performers to get their works out to a wider audience, it's aimed at anyone who wants to start a live stream on YouTube or Twitch.

Youcast promises an "intuitive interface", automatic image optimisation, and templates for live shows, game-plays and screen capturing. All things that make it easy for users to start their own live stream without any prior technical experience.

The package is the first streaming software to support Intel RealSense depth-sensing technology, essentially making it possible to swap backgrounds in real-time without using a green screen. As the software lets people live stream without having to worry about complicated settings, this is pitched as appealing to a wide range of users.

It's also available to trial in full version form for up to 30 days. After that, you'll have to pay £3 a month or £20 for a 12-month subscription to continue using it. Interested? Then you should enter **www.magix.com** into your browser forthwith.



Nvidia Shield TV 16GB

Could this be the king of the media streaming set-top boxes?

DETAILS

- Price: £149.99 for the 16GB unit/£219.99 for the 500GB unit
- Manufacturer: Nvidia
- Website: goo.gl/UyWkfU
- Requirements: GTX650+, Intel i3, 4GB minimum for streaming local games, Android/Google account, Nvidia account for cloud and streaming games

The Android set-top box war may have just been won with the Nvidia Shield TV.

Where other Android entertainment units feature one element or another and usually fall down in several more, this rather wonderful box from Nvidia just keeps giving.

To start with, the Nvidia Shield is a surprisingly high powered device, with an impressive Nvidia Tegra X1 processor at its core, an Nvidia custom-made 256-core GPU driving some splendid visuals and 3GB of memory helping to tie everything up and keeping the experience as smooth as possible.

The combination of the Tegra CPU and GPU means that the Shield is 4K ready, with playback of 60fps 4K content and 4K capture at 30fps. It's a staggering amount of processing involved, and this is all coming from a box that measures just 25 x 210 x 130mm and weighs only 650g.

Other connectivity includes gigabit Ethernet, HDMI 2.0, a pair of USB 3.0 ports, a micro-USB 2.0 port, a micro-SD card slot, an IR receiver,

▲ *The Nvidia Shield TV looks as good as it performs*



▲ *The Shield, controller and wand-remote all combine to make for an excellent entertainment unit*

802.11ac 2x2 MIMO dual-band wi-fi and Bluetooth 4.1.

There are two versions available: the standard model with 16GB of flash storage and a Pro version with 500GB of storage and bundled with a Shield stick-remote. All versions feature the same Android 5.1 Lollipop OS, with Android TV and Google Cast.

In addition to Android TV, Nvidia has also included its own Made for Nvidia section, which highlights a number of games that will run perfectly with the system specifications, as well as the included Shield controller.

However good these additions are, the icing on the

cake is the fact you can stream all the games on your PC through your home network to the Shield, for play on your TV. You will need a compatible Nvidia graphics card installed in your PC to begin with and your network really needs to be up to scratch – with a wired gigabit network proving to be the best quality. In our tests, the Shield outperformed the Steam Link when it came to the quality and stability of streaming games.

There's also a good selection of TV apps on offer from within the Shield/Android TV UI. Netflix, BBC iPlayer and a few other



catch-up services are there, as well as YouTube and more. And although 4K content may well be thin on the ground at the moment, HD certainly looks great.

The bundled Shield controller makes for a refreshing change too. Rather than opting for touchpads, like the Steam Controller, Nvidia has gone for a more traditional Xbox-like feel, with the D-Pad located above the left stick, the familiar diamond-button arrangement and extras such as voice control and charging via the USB port.

Although the Nvidia Shield TV does cost a little more than the Steam Link, at £149.99 for the 16GB version (via Ebuyer), moving up to £219.99 (Ebuyer) for the 500GB Pro version, it's far better and more useful for game streaming and general entertainment.

It works extremely well, is streamlined enough for placement in a TV unit, and it performs spectacularly.

mm David Hayward

The best Android-based media unit so far



Samsung Portable SSD T3

Any similarities between the name of this product and a gadget mag are purely coincidental

DETAILS

- Price: £151.99
- Manufacturer: Samsung
- Website: www.samsung.com/t3
- Requirements: USB 3.1, 3.0 or 2.0 port, Windows 7 or later, Mac OS X 10.8 or later



	Read [MB/s]	Write [MB/s]
Seq. Q1T1	439.4	279.5
Seq. Q1T3	145.4	37.25
Seq. Q3T1	399.2	209.1
Seq. Q3T3	19.72	2.289

Samsung is always looking for new ways to exploit its VNAND flash technology, and the T3 is the latest it's come up with.

Essentially a USB memory key on steroids, the T3 is a precision-made device that looks like something Q would hand James Bond before sending him into action.

It's just 7.4cm long and therefore is much easier to carry around than a typical external drive, while offering similar capacities.

The review model was 500GB, though Samsung also

makes 250GB, 1TB and 2TB versions of the T3.

A pleasant surprise for this reviewer was that the T3 uses a USB Type-C connector, though the cable provided converts this to the normal USB blade. The interface is USB 3.1 gen-1, limited to 5GB/s, though that's more than enough for the flash memory inside it.

Security is provided by a baked-in AES 256-bit

encryption, and the drive comes pre-formatted in exFAT for large file size convenience.

But where this unit really distinguishes itself from a typical external drive is in just how fast you can get your data on and off it.

What I've noticed with USB 3.0 SSDs is that the performance can vary, depending on what chip is used for that port and the PC. The best read speed I ever got was 439.4MB/s, though in that instance only 279.5MB/s writing.

On another system I got about 350MB/s read but almost as high write, so the potential is in here for the 450MB/s quoted performance if you have UASP mode and USB 3.1 on your system.

Unless you're crazy enough to plug the T3 into a USB 2.0 port, you're unlikely to be disappointed with the speed on offer. However, you need to be mindful that the performance on offer will be generally limited by the other drive you're using for the transfer, so to really leverage this speed, you'll also need an SSD in your PC.

The only aspect of this device that might need some adjustment is the price. The 250GB model is close to £100, whereas the 500GB one I tested is a much better value £151.99. And for those with very deep pockets, the 2TB model is nearly £600, almost a linear scale from the 500GB drive.

As you can buy a 500GB 2.5" SSD for around £135, and a USB 3.0 caddy for a fiver, there's a £12 premium for the cuteness factor.

Some might pay that for the 500GB model, though the 250GB seems wildly expensive in comparison.

Overall, the T3 is a neat device that's beautifully made, and it could be a godsend to anyone wanting to leave the office on time with their data to hand.

mm Mark Pickavance

Portable SSD performance on USB 3.1

Specifications	Samsung Portable SSD T3
Capacity	250GB, 500GB, 1TB, 2TB
Interface	Compatible with USB 3.1(Gen.1, 5Gbps), 3.0, 2.0
Dimension (L X W X H)	74 x 58 x 10.5mm
Weight6)	51g (2TB)
Transfer Speed7)	Up to 450MB/s
UASP Mode	Supported
Encryption	AES 256-bit hardware encryption
Security	Password setting (optional) (*User can set password when it is necessary.) Requires Windows 7 or higher, Mac OS 10.7 or higher and Android KitKat (version 4.4) or higher.
Certification	CE, BSMI, KC, VCCI, C-tick, FCC, IC, UL, TUV, CB, EAC
RoHS Compliance	RoHS2
Warranty	Limited three-year



Ricoh WG-M1 Action Camera

Ricoh demonstrates that action cameras don't need to cost the earth

DETAILS

- Price: £160
- Manufacturer: Ricoh (Pentax)
- Website: ricoh-imaging.co.uk
- Requirements: An action lifestyle

Ricoh has a rich history of making desirable small cameras, but the WG-M1 is something of a departure even for them. It's an inexpensive GoPro competitor that is fully waterproof to 10m without needing an additional enclosure.

At first glance it looks rather like a miniature submersible probe, foregoing the typical camera layout for something much more interesting.

The shape dictates that the controls are on the side, there's a 1.5" colour display on the top, and a fish-eye lens at one end.

As a camera it can shoot still images and up to 1080p video with its 14MP sensor, and be simultaneously connected by wi-fi to an Android or iOS device.

Images and movies are captured to a micro-SD card that Ricoh doesn't include,

and you locate that behind a double-latched waterproof door, along with the removable battery.

Charging is via a provided micro-B USB cable and charger, as there's no external charging gizmo included in the box. However, Ricoh reused its DB-65 battery design from previous compact cameras, and it's easy to get replacements and a charger relatively inexpensively.

Being so small and having a limited number of controls, there aren't the range of shooting modes you might expect from an ordinary compact camera.

The lens can be set in Wide, Mid, Narrow or Water



very grainy. For that reason, I wouldn't recommend trying to use this to shoot underwater in the UK, for example. Ricoh had the equatorial lighting experience more in mind, I'm sure.

In stronger light, you get much better results even if the colour balance sometimes seems overly biased towards yellow, for some reason.

Compared with the GoPro products, the first obvious difference is that this won't shoot 60fps in 1080p resolution, only 30fps. It also doesn't have a physical control interface that might be used to connect it to a drone, for example.

The best aspect of this design is the camera/tablet control, which is excellent, and there's almost no discernible lag between what the camera sees and its presentation on your mobile device.

The challenge for Ricoh is that you can get the GoPro Hero 3+ Silver for £199 discounted, and it comes with a waterproof enclosure rated to aqualung-only depth of 40m. However, I'd say the Ricoh is better to use than the

Highlights

- Supports 1080p30 & 720p60 video.
- Capture 14MP photos.
- Ultra-wide angle lens.
- Waterproof to 32', shockproof up to 6.5'.
- Cold-resistant down to 14°F.
- Slow-motion 120fps recording mode.
- Rugged design with large control buttons.
- Micro HDMI output.
- Built-In wi-fi connectivity.
- Flat adhesive mount included.





Hero 3+, and easier to start with for the inexperienced.

What it could have done to make the WG-M1 even more enticing is to add more accessories in the box, because what you get now isn't bountiful.

At this time, you only get a single adhesive mount and a carabiner strap, although you can buy a large range of well-designed accessories

from Ricoh. These include ground spikes, handlebar mounts, and magnetic, suction cup and helmet connectors, to mention just a few. Unfortunately they're not cheap. The handlebar mount, for example, is an eye-watering £29.99 from Jessops.

The only redemption is that you're not forced to use the Ricoh official ones, as it used

a standard threaded camera mount on the underside of the WG-M1.

Overall, it's a mixed bag. I like the price, the construction quality and the overall concept. Where the WG-M1 seems to fall down is mostly on minor details that could have elevated this design into something with a wider appeal.

For example, if you set the camera to still shot and lens to narrow and then power off, you'll find it has returned to 'Wide' when you power up and video mode. And a 24-minute limit on video recording entirely

undermines this as a journey recording device.

The design team behind this camera probably needed to take a step back and appreciate the good things they had and how they might make them even better.

This is the firmware polish that Ricoh needs to apply, if the WG-M1 is to provide GoPro with the sort of competition it richly deserves.

mm Mark Pickavance



A tidy action camera that's less than a GoPro



XQISIT S20 Portable Bluetooth Speaker

XQISIT delivers a great combination of looks and performance

DETAILS

- Price: £44.99
- Manufacturer: XQISIT
- Website: www.xqisit.com
- Requirements: Audio device with either Bluetooth 2.1 or better, or 3.5mm audio line out



XQISIT is a new company to this reviewer and makes a vast range of phone and audio accessories, from Bluetooth headsets to car chargers.

Its website lists it as being based in Germany, though the hardware I received declares on the exterior that it was built in the P.R.C. (China), predictably.

Wherever this device was conceived and made, the S20 is a nicely engineered, compact and portable speaker that can be used either using Bluetooth or a 3.5mm audio jack from any audio device with either of those options.

And as these devices tend to offer, using Bluetooth allows you to change volume, skip track and even answer the phone through a built-in

microphone, should you need that capability. These are the sort of features that I'd expect from any portable speaker these days.

But what makes this item stand out is the all-metal construction and how compact XQISIT managed to make it. The length and breadth of the S20 are less than my Nexus 5X phone, though at 2.5cm thick, it's much deeper.

Considering its relatively diminutive size, you'd imagine that it wouldn't be able to push much sound, but the dual 3W drivers on it are deceptively punchy.

And the lithium-ion battery is good for up to ten hours of output, and a full recharge using USB can be achieved in about four hours using a standard USB micro-B source.

To add even more usefulness to the S20, XQISIT also included a standard USB port, allowing you to turn the charging cable around and use the battery in the speaker to charge a phone or tablet.

A recent price drop has also made it highly affordable, so what's the skeleton in the S20's closet?

I can find only one, and that's the Bluetooth chip, in that it only supports version 2.1 + EDR, a spec that was finalised way back in 2007. Both Bluetooth 3.0 and 4.x introduced enhancements that help audio quality, and the S20 can't take advantage of any of them unfortunately. The specs also don't mention A2DP or aptX, pointedly.

Therefore for those wishing to get the best sound out of the S20, I'd recommend the 3.5mm jack connection, even if it isn't as wireless or interactive.

I also find the gold version much less flattering than the black or silver one I was blessed to review, but everyone has a different style threshold.

Those points aside, if you'd like some well-engineered speakers to annoy numerous others with your musical bias, then the S20 could easily fit the bill.

Compared with many plastic speakers I've tried, these are in another class entirely.

mm Mark Pickavance

Specifications

- 2 x 3W HD stereo sound.
- Bluetooth 2.1 + EDR.
- Integrated Li-ion battery with 2500mAh.
- Up to ten hours of play time with only four hours charging time.
- Built-in microphone.
- 150-18kHz frequency range.
- 4 ohms impedance.
- Charging cable included.
- 3.5mm line-in.
- Dimensions: 6.65 x 2.5 x 14.4cm.
- Weight: 262g.

Highly desirable speakers



SwannOne

Michael gets more grey hairs with this home protection system

DETAILS

- Price: £389
- Manufacturer: Swann
- Website: www.swannone.com
- Requirements: Plenty of patience

Home security continues to be a hot topic as various companies present their slant on how protection of the home can be implemented. One such company is Swann with its SwannOne kit. This particular kit arrives with the claim of being easy to set up and easy to use. I can only agree with part of this claim.

The kit consists of a central Smart Hub unit, from which you can link a video camera, motion detector sensor, two door / window sensors, smart plug and two key fobs, which are all included in the box. Power leads for the Smart Hub and camera are provided while, the smart plug apart, the other components make use of pre-installed batteries. You also get a brief quick start guide and some stickers to advertise that your home is under Swann's protection.

Prior to the nitty gritty of setting up the various hardware components, you'll need to download the appropriate app



from the iOS or Android store. This app will allow you to create an online account with an email address, location details, username and a suitable password made up of upper and lower case characters plus a numeral. The app will also assist in setting up the kit.

Referring back to my opening paragraph, I mentioned the claim of this product being easy to set up. This claim hardly gels with my experience. Ignoring the fact that I had been sent a sample previously used by somebody else which needed a full reset organised by Swann's PR agency before I could continue with setting up the product, the only element of

the kit that correctly set up at the first time of asking was the plinth-shaped Smart Hub as it linked to a power source and established a connection with my router.

The camera unit insisted on carrying out a firmware update, only to fail on the first five attempts at roughly the 86% mark. As this process can take up to 30 minutes each time, it would be no exaggeration to state I was not best pleased. The sixth attempt did manage to complete the firmware update, and I was able to give the camera a name and position it to delivering a live video feed to a smartphone.

No firmware updates were required by the other components. However, the motion detector sensor, door / window sensors and key fobs all required at least one reset before the Smart Hub was able to establish a connection with them. As for the smart plug, my patience ran out before a connection could be made. I took the point of view that if the Smart Hub could ignore this element, then so could I.

Not everything was a failure. Once set up, the various elements did help provide peace of mind, and it could be argued that the presence of the SwannOne kit did deter any possible break-in attempts. While away from home you get emails, push notifications and a live feed of what's occurring in your absence. There's an option to add a second smartphone to receive these messages and feeds if that suits your current circumstances. You could also expand the cover given by this security system with additional devices from Swann, but I think I'll let others have that particular pleasure.

mm Michael Fereday

Reasonable but marred by numerous problems



Soundfreaq Sound Rise Wood

We wake up to modern connectivity and our own choice of music

DETAILS

- Price: ~£65
- Manufacturer: Soundfreaq
- Website: goo.gl/kB1sKz
- Requirements: Bluetooth device for streaming, 3.5mm Aux jack sound source

Soundfreaq exactly a household name in the UK, but it is popular among audiophiles the world over, and for good reason, if the Sound Rise Wood is anything to by.

This is a modern spin on the radio alarm clock and one that offers Bluetooth connectivity, a USB port for charging your phone, and the usual features you'd expect.

As an alarm clock, it's a tasteful and elegant wood device which will look good on any bedside cabinet. A grey speaker cloth in two removable sections covers the single 2" speaker at the front of the unit, with a decent-sized LCD readout above detailing the current time, connectivity and alarm times.

The top of the Sound Rise Wood is angled to a near-'V' shape cutout, with the main controls for the clock recessed into the wood frame, along a light-brown coloured strip. The rear of the Rise Wood is finished off with the plastic backing that the speaker cloth frame attaches to, and at the bottom is where you'll find the USB port, power, aux-in, antenna port for FM radio, and dimmer and tone buttons.

The operation and setup of the Sound Rise Wood is extremely easy. Connecting via



▲ The Soundfreaq Sound Rise Wood is a stylish and discrete looking alarm clock



▲ It does more than wake you up though, with Bluetooth and Aux input

Bluetooth to another device is as simple as pressing the pair button on the top control strip. Likewise, setting up the dual alarms can be achieved by pressing one of two alarm icon buttons and adjusting the time – with weekday and weekend settings too.

The sound quality is very good, considering it's a single

speaker housed in a 14.2 x 13.2 x 8.3mm box. Naturally, it's not going to replace your hi-fi, but if you're after reasonably loud and stylish alarm clock, they you can forgive the lack of ear-bleeding volume levels. It's also worth mentioning that the aux port makes this an interesting PC speaker or stand-alone speaker



for connection to any 3.5mm audio source.

As this is Bluetooth enabled, you could essentially set the alarm to a selection of music from your NAS drive, charge it up overnight via the USB port, and wake up to whatever you want, instead of the usual ramblings of the local morning DJ. The controls along the top of the Sound Rise Wood also allow you to skip forward and back through your track listings too, so you don't need to reach for the phone to enjoy a track before you drag yourself out of bed.

For around £65, the Soundfreaq Sound Rise Wood is an excellent alternative to the kind of standard DAB radio alarm clocks you'd pick up from high-street electrical shops. It's stylish, functional and discreet enough to blend in with the other bedroom accessories. The problem now, though, is actually getting out of bed.

mm David Hayward

Looks great and sounds great too



Tibo Plus Mini Speakers

Great speakers for a tad over a hundred pound? Sounds good to us

DETAILS

- Price: £109.95
- Manufacturer: Tibo Electronics
- Website: goo.gl/noLCom
- Requirements: Standard power for the speakers, USB cable to connect to a PC

Tibo Electronics is a relatively new name, having been founded in 2010.

However, despite the company's youth, it has so far developed some pretty impressive audio products.

The newest to be released from the wireless range is the Plus Mini Speakers. This is a set of two desktop speakers (one active, the other passive), measuring 130 x 157 x 133mm each and weighing 5.49kg for the pair (3kg for the active speaker, 2.49kg for the passive). The design is simple enough and quite traditional, but effective.

The tough, matte-black plastic body houses a 0.75" soft dome tweeter, and a 3" woofer in each speaker. Connectivity is very good, with a range of physical ports on the active speaker unit, which include a USB audio port for connection to a PC, 3.5mm aux port, active subwoofer output, power, volume and power dial, a Bluetooth pairing button and a pair of output connections for the other speaker.

As we mentioned, these are Bluetooth capable speakers as well as being physically cabled. Setup is as simple as you would expect from a modern Bluetooth product,



▲ The Tibo Plus Mini speakers sound great, and are small enough for your desktop



▲ There's a good selection of inputs and outputs

and there's no distinguishable loss in sound quality when comparing both the Bluetooth and cabled options.

There's a total of 40W output from the Tibo Plus Mini, which is actually quite

good for a set of speakers of this size. The sound quality was excellent too, with a wide range of frequencies available and a good meaty bass to thump out the lower end of the scale.

While they may not replace your current hi-fi setup, the Tibo Plus Mini speakers are ideal for projecting good-quality sound across a larger space. Once you push the volume all the way up, they fill the room nicely, and there's very little distortion too. In fact the only thing missing to make these the perfect computer desktop speakers would be the addition of a front headphone/headset port for when you want some decent audio in-game.

There's a lot to like about the Tibo Plus Mini Speakers. They sound great, they're decent enough to look at, they're easy to use and set up, and they're reasonably priced.

There are much smaller Bluetooth speakers available, and likewise some that sound infinitely better. But considering everything we've mentioned, the Tibo Plus Mini speakers are a great choice for those who want decent sound from a compact and well-priced setup.

mm David Hayward

Great sound from a compact set of desktop speakers



GROUP TEST

15" Laptops

There are plenty of massive laptops on the market, but not everyone needs a portable with a large screen. At the same time, though, they want something that offers more to look at than 13" notebooks can offer.

Perfectly serving this sector are 15" laptops, which strike a good balance between screen space and portability.

We've been testing a few to give you a taste of what's available.

15" Laptops

Acer E1-572

DETAILS

- Price: £259
- Manufacturer: Acer
- Website: goo.gl/tUR849
- Requirements: Microsoft account, extra three-year warranty costs more

Acer's line of Aspire E1 laptops come in all sizes and specifications and their numbering system can lead to some confusion, because not all E1-57x laptops are created equally. Some, it appears, have been built especially for certain high-street chains, whereas others appear to be web-only exclusives. It's a little unnecessary to be honest, and it forces you to shop around more than is really needed just to find the specification you want – only to discover someone else is offering something slightly different, usually for a cheaper price.

The processors range from i3s through to the more powerful i7s with varying amounts of memory included and different chassis colours and styles, so despite the complaint that they lack any form of standardisation they do pack a decent combination of internal components. The model on test comes with an

1.7GHz i3 4010U, 8GB DDR3 RAM, an Intel HD4400 GPU, a 1TB 5400rpm hard drive and Windows 8.1.

It has a 15.6" LED backlit screen with a maximum resolution of 1366 x 768. You'll also find a decent enough range of connections and ports, with a pair of USB 2.0 and a single USB 3.0, wireless n and Bluetooth 4.0. There's a 10/100 Ethernet port, HDMI and VGA, along with a DVD/RW optical drive and an SD card reader.

The style of this E1-572 is very much in line with the rest of the Acer budget range. In other words, it's quite uninspiring. However, it's certainly more than functional enough if you can look beyond its physical appearance. The touchpad is large enough and reasonably responsive, but it didn't like the Windows 8.1 gestures. The keyboard is spaced out and has the added bonus of a numerical keypad alongside the full-sized keyboard. It's not the best keyboard we've ever used, admittedly, but for casual use it's good enough.

The E1-572 does feel a little cheap, we have to say. Opening the lid issued numerous creaks and groans, and it's clear that lower-quality materials have been used throughout.

Touching the bezel around the screen caused all kinds of distortion, and a little weight on

the palm rest areas caused the laptop to flex slightly. It wasn't good, to say the least.

Performance-wise, though, it did okay, probably thanks to the big chunk of RAM Acer fitted. Booting up is fairly slow, but once it gets going, the Acer does a decent enough job of everyday office-related tasks. Video editing wasn't brilliant, but image manipulation was good. Again, this is more than likely due to the amount of memory, since photo-editing programs lap up RAM. Gaming isn't really up to much, though, unless you're only going to be playing something very simple indeed.

The large 1TB hard drive makes for a laptop that most users can use without fear of running low on space in the foreseeable future. This is really what this Acer is all about: it's a simple laptop that can brush past its lack of a powerful CPU and GPU with a lot of memory and disk space.



Asus X550CA 15.6" Laptop

DETAILS

- Price: £270
- Manufacturer: Asus
- Website: goo.gl/ga8z31
- Requirements: Microsoft account, Asus account for cloud storage

Asus has in the past often produced some very impressive laptops at considerably reasonable prices. These Asus X550CA models come with processors ranging from the Intel Celeron 1007U through to a Core i7 3537U, with the one we tested having a 1.8GHz Core i5 3337U with a Turbo Boost rated up to 2.7GHz. It also has 4GB of DDR3 RAM, a 750GB 5400rpm hard drive and an Intel HD 4000 GPU providing a maximum resolution of 1366 x 768.

There's a DVD/RW optical drive, which is quite a surprising addition to a laptop these days, accompanied by an SD card reader. In addition, the laptop includes a gigabit Ethernet port, Bluetooth 4.0, a 0.3 megapixel webcam, a single USB 3.0 and a single USB 2.0 port. There's also an HDMI and a VGA port thrown into the mix, as if the Asus didn't already have enough bolted on.

Surprisingly, despite all this, the X550CA doesn't feel cramped. In fact, it's really a rather spacious and well laid out laptop. The polished aluminium look is very distinctive and gives it a more expensive feel. There's an interesting spiral effect pattern on the lid, almost like a fingerprint, which adds a level



“ It’s really a rather spacious and well laid out laptop ”

of class and elegance you wouldn't normally find in a laptop of this price. Furthermore, it's very thin, measuring 380 x 251 x 24mm and weighing 2.3kg, but it doesn't feel too flimsy or cheap.

The keyboard is responsive and well laid out to maximise typing and frequent use. Often, 15" laptops go all out with the appearance and finally plug a stinker of a keyboard in place. But the X550CA's keyboard is spaced

out and feels good to type on.

The X550CA comes with Windows 8.1, and thanks to the large touchpad, you can enjoy all the benefits of Microsoft's touch-centric OS without having to paw ineffectually at the screen. Interestingly, the touchpad on the Asus is one of the most responsive we've ever tested, especially when it comes to the combination of gestures and Windows 8.1.

While intensive gaming may be out of the question on the X550CA, this laptop is by no means a slouch. The OS was responsive, and other general tasks such as browsing, image manipulation and office duties were performed without any problems. Due to the somewhat slower hard drive, though, it was pretty slow to boot up, and it felt like it took a while to get going. Once it was up and running, though, it was perfectly adequate.

Battery life lasted a tad over four and a half hours, while browsing and using LibreOffice. This could be improved somewhat if an SSD was in place instead of the slower and more power-hungry hard drive. Nevertheless, we were quite impressed with the Asus X550CA. It performs well, it's light, it looks good, and it's more than adequate for most users' needs.



15" Laptops

HP ProBook 455 G3

DETAILS

- Price: £339
- Manufacturer: HP
- Website: goo.gl/IBdWMt
- Requirements: Microsoft account

The HP ProBook range is generally aimed at small to medium business users, but this third-generation entry-level laptop is available for home consumers as well.

Being essentially a business machine, you get something a little different to regular consumer laptops. For example, there's a thin layer of Mylar protecting the keyboard electronics and membrane, making it spill resistant. Also, there's the HP Security Suite installed by default, which will help you encrypt your drive, permanently delete data and restrict access, plus it offers anti-virus protection too.

Aside from these business-centric additions, the ProBook 455 G3 is a fairly run-of-the-mill laptop, although in all honesty it's not a bad little performer.

You get a 2.2GHz AMD quad-core A8-7410 APU, with a dedicated AMD Radeon R5 GPU. There's also 4GB of DDR3L RAM and a 500GB 7200rpm hard drive.

Accompanying the internals are a DVD/RW SuperMulti optical drive, gigabit Ethernet, 802.11n wireless and Bluetooth 4.0.

Connectivity isn't too bad, with a pair of USB 2.0 and USB 3.0 ports, a single HDMI, a VGA port and a SD card reader. The display is a 15.6" LED backlit anti-glare affair, with a maximum resolution of 1366 x 768.

We particularly liked the large touchpad, which we thought was very responsive, with a decent pair of mouse buttons. Unfortunately, the keyboard wasn't quite as good as we would have hoped. Perhaps it has something to do with the spill protection, but it felt a little too soft, with

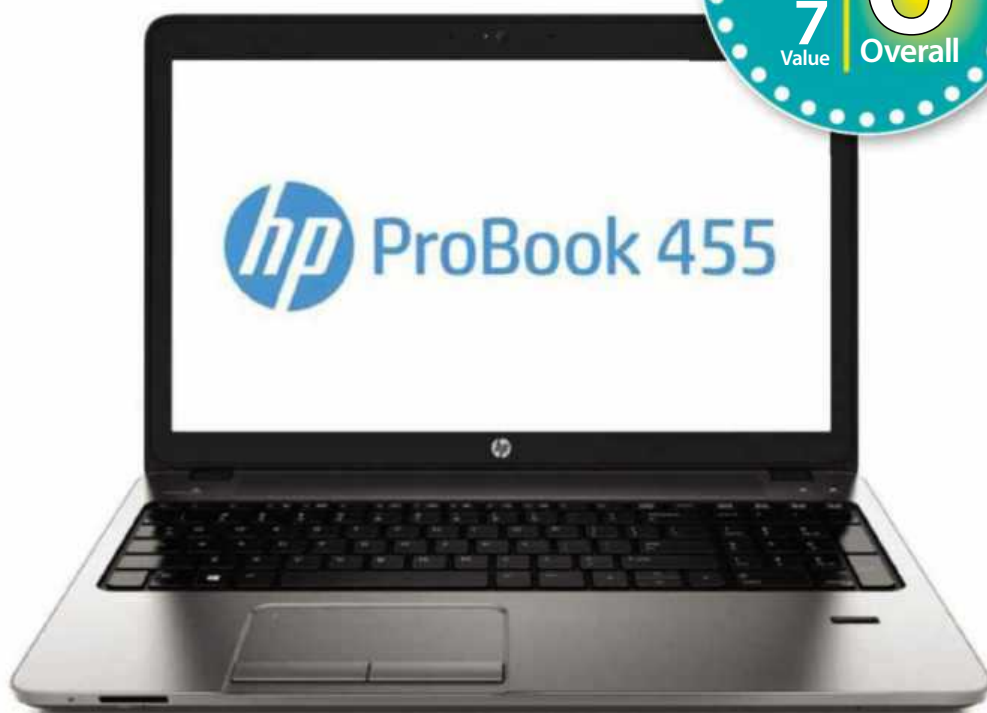
little too much travel for our liking – especially considering the quality of the keyboard on the Asus model.

The build quality of the entire ProBook 455 G3, though, is generally good. The matte-black finish to the lid, with a glossy HP badge in the centre, is quite eye

catching, especially when you have the lid open and the brushed aluminium effect of the base casing is exposed. But the ProBook 455 G3 isn't about looks; its primary function is to be a good working laptop for the user, and this it does admirably.

It's not a gaming laptop, but the combination of a half-decent CPU and a dedicated GPU make for a machine that could play a number of fairly recent titles without too much strain. The same applies to browsing and office tasks, and the likes of video or photo editing aren't beyond the realms of possibility either.

The price isn't too bad for a laptop of this quality either, but in comparison to the Asus model, it doesn't stack up quite as well. It all depends on whether you're a fan of the HP brand or not.



Lenovo IdeaPad G50-80

DETAILS

- Price: £299.99
- Manufacturer: Lenovo
- Website: goo.gl/4ILCa8
- Requirements: Microsoft account



Since entering the home user market, Lenovo has offered us some decent laptops, taking some of the better components from its business line and adapting them appropriately. The G505s were the first generation of entry-level home laptops, and now we're up to the G50-80, so it'll be interesting to see if Lenovo is still producing something worthwhile.

The G50-80 comes with a 1.7GHz Intel Core i3-4005U processor, 6GB of DDR3L memory, an Intel HD4400 GPU and a copy of Windows 8.1.

You also get a 1TB 5400rpm hard drive, a DVD/RW optical drive and a SD card reader. There's 802.11ac dual-band wi-fi, Bluetooth 4.0 and a 10/100 Ethernet port, accompanied by a pair of USB 3.0 ports and a single USB 2.0. HDMI and VGA also make a welcome appearance, as does a 2-in-1 audio jack for headphone and mic connections.

The IdeaPad G50-80 has a 15.6" LED backlit screen with a 1366 x 768 resolution, and there's a 720p webcam placed in the top bezel. Its design reminds of the older-style Alienware laptops, before Dell got its hands on the company, with an all-black look in a mixed matte and glossy finish. It's certainly functional enough but not particularly stylish. We did like, though, the curved keys and the spaced keyboard.



Its performance is quite good. Despite the lack of raw CPU grunt, the G50-80 performed well within Windows 8.1. In our simple office tests, the G50-80 performed without any problems whatsoever. Video editing was a breeze, thanks

to the added graphics power, as was image editing, and we suspect the 6GB of memory helped out considerably.

The G50 range can get a little confusing, the G50-80 model we had for testing seemed a little older than the site specified, with Lenovo

offering an i7 model as well. We're guessing that, as with some of the other models we've looked at in the group, the G50 can be tweaked considerably depending on where you're buying it. The Currys version, for example, may boast a better processor, whereas the Amazon version may drop the RAM to 4GB. On the whole, the Lenovo G50-80 is an okay laptop. The price starts at around £300, so it's not too badly priced. However, you may need to shop around considerably until you find the specification that will match your need, so you can pretty much guarantee that the final cost will likely be a fair bit more once you factor in the better processor and so on.

If you're after a reliable workhorse of a laptop, though, and you don't mind the Lenovo brand, then this could be a good one to check out.

15" Laptops

Toshiba Satellite C55-C-1M9

DETAILS

- Price: £269
- Manufacturer: Toshiba
- Website: goo.gl/rCXePw
- Requirements: Microsoft account

For those who aren't looking to invest too much in a laptop and who want one for very simple duties, the newer Toshiba C55 range may be just the ticket.

For around £270, the Toshiba Satellite C55-C-1M9 offers an 2.4GHz Intel Celeron N2830 dual-core processor, 4GB of DDR3 memory, a 1TB 5400rpm hard drive and Windows 10 Home.

The 15.6" TFT LED backlit screen has a maximum resolution of 1366 x 768 and is driven along at an okay rate thanks to the Intel Bay Trail HD GPU. Connectivity includes HDMI, a pair of USB 2.0 ports, a single USB 3.0 port, gigabit Ethernet, 802.11n wi-fi, Bluetooth 4.0, a 2-in-1 card reader and a DVD/RW optical drive.

The C55-C-1M9 comes in two designs. One has a matte-black finish and a brushed metal effect around the keyboard. The other has a glossy white finish, much like an Apple product. The overall effect looks good, although we prefer the silver finish on the likes of the Asus machine.

Although the Celeron processor may not be up to much, compared to the Core-i models we've looked at, it can still hold its own within Windows and for most basic computing duties. Video editing, although only a basic test, worked well with the



C55-C-1M9, as did photo manipulation. The same goes for watching videos and even a spot of lightweight gaming – we're talking platform type stuff here, not the latest 3D, open-world titles.

While the Toshiba may not be the performance king, it is a reassuringly stable and tough laptop. The build quality is great, with a solid feel to every hinge and panel. The pre-installed Toshiba software

It's a good consumer laptop and one that you'll find on the shelves of many high-street electrical retailers. It won't win any performance or design awards, but it'll serve you well enough.

“ The build quality is great, with a solid feel to every hinge and panel ”

Thankfully, the old Toshiba problem of poor battery life appears to have been sorted. This laptop lasted well over seven hours in our tests and a tad over four hours when we pushed the laptop into a continual video loop.

doesn't seem too intrusive either. It's the sort of laptop you can power up and use without first having to faff around uninstalling or disabling unwanted software before you feel like you're getting your money's worth out of the CPU.



Dell Inspiron 15 3000 Series

DETAILS

- Price: £219
- Manufacturer: Dell
- Website: goo.gl/rzWm2a
- Requirements: Microsoft account



Dell's home range of laptops tend to be divided between the cheap but no so good and the okay but ludicrously expensive. The Inspiron 15 3000 Series of laptops sit somewhere on the border, in that they're generally good enough but not really worth the money.

The Inspiron 15 3000 we tried has a 15.6" LED backlit display capable of 1366 x 768 and is fitted with a 2GHz Celeron N3050, 4GB DDR3 RAM, an Intel HD GPU and a 500GB 5400rpm hard drive. It has 802.11n wi-fi, Bluetooth 4.0, 10/100 Ethernet, a pair of USB 2.0 ports, a single USB 3.0 port, HDMI out and an SD card reader.

The 15 3000 isn't a bad-looking laptop, by modern slimline standards. The matte-black finish throughout combined with a decent full-sized keyboard, with a numerical pad, make for a good-looking laptop. It's only when you get to handle the Inspiron 15 3000 that you realise the quality is merely skin deep.

The entire laptop feels pretty cheap. There's movement and flexing throughout the chassis and the screen, along with the bezel, and it doesn't feel up to too many openings and closings. Likewise, the buttons on the touchpad feel very flimsy, plus the keys are

squishy and can easily be pulled up if you catch them when typing.

The overall cheap plastic feel is quite shocking really, as we expected something better from Dell. In terms of

Just browsing Windows 10 felt very sluggish, almost to the point where it was unusable. We did, however, install Ubuntu, just as an afterthought, and it has to be said that this performed

Interestingly, there is another 15 3000 Celeron model with Ubuntu 14.04, sold for just under £200.

Clearly, we weren't all that impressed with the Dell Inspiron 15 3000. A lot more could have been done to push the performance, and the overall build quality let it down considerably. You're better off spending a tad more for the Asus, Acer or Toshiba machines.

“ When you get to handle the Inspiron, you realise the quality is merely skin deep ”

performance, the Inspiron didn't exactly inspire much confidence. We found gaming, other than something like *Terraria*, nearly impossible. Office tasks were handled okay, but even LibreOffice had the tendency to take long pauses between saves. And video and photo editing was a nightmare, with processing taking an absolute age to complete.

much better. Obviously being a more efficient OS made everything operate a little snappier than it did with a Microsoft OS, and while running Linux the office tasks and video and photo editing worked well. Even a number of Linux games via Steam ran okay, but considering most users will stick with Windows 10, it's hardly fair to the other laptops on test to score the Dell based on any of this.





Asus X550CA

The Asus X550CA is this week's winner thanks to its lovely design, good overall performance and reasonable price.

The range does differ slightly depending on where you shop, but it doesn't take too much to hunt down the one that will work best for your needs.



Toshiba Satellite C55-C-1M9

We were pleasantly surprised with the Toshiba Satellite C55-C-1M9. It looked okay, performed well and had everything you could ask for from a budget 15" laptop.

By spending slightly more you'll get the Asus model, but if you're on a strict budget, the Toshiba will certainly fit the bill.

How We Tested

Each laptop was tested with the software and OS it arrived with, with the exception of the Dell Inspiron 15 3000, where we installed a copy of Ubuntu 15.10. We used Windows Movie Maker and OpenShot for video editing, and Gimp for photo and image manipulation. Other tests included a brief selection of low-performance games from the Steam library.

	Acer E1-572	Asus X550CA	HP ProBook 455 G3	Lenovo IdeaPad G50-80	Toshiba Satellite C55-C-1M9	Dell Inspiron 15 3000
Price	£259	£270	£339	£299.99	£269	£219
Dimensions	256 x 25 x 381mm	380 x 251 x 24mm	378 x 264 x 23mm	384 x 265 x 25mm	380 x 259 x 23mm	380 x 260 x 21mm
Weight	2.3kg	2.3kg	2.2kg	2.3kg	2.2kg	2.1kg
Screen	15.6" 1366 x 768	15.6" 1366 x 768	Mini-ITX	15.6" 1366 x 768	15.6" 1366 x 768	15.6" 1366 x 768
CPU	i3-4010U 1.7GHz	i5-3337U 1.8GHz	A8-7410 2.2GHz	i3-4005U 1.7GHz	Celeron N2830 2.4GHz	Celeron N3050 2GHz
Memory	8GB	4GB	4GB	6GB	4GB	4GB
HDD	1TB	750GB	500GB	1TB	1TB	500GB
OS Installed	Windows 8.1	Windows 8.1	Windows 10	Windows 8.1	Windows 10	Windows 10

Top 5

Things Not To Skimp On

Sometimes, you really should just spend a little extra

1 Earphones And Headphones

Forking out 200 quid for a couple of bits of wire with some tiny speakers at the end might seem excessive to some people. But others see expensive headphones as a worthwhile investment. Of course, most people don't need to spend hundreds to get satisfactory audio. Even a £40 headset can do the trick. Just don't go picking up a pair of headphones for a fiver and expect them to be any good. There might be a chance you get lucky and find something decent, but it's far more likely they'll make your favourite bands sound like they're performing from the inside of a box full of blankets.

2 Mice

If you don't use your computer much and you're not a gamer, then you can probably get along quite happily with a mouse that costs about £5. If you want something that you'll actually enjoy using, though, then you're probably looking spending at least £30. That will get you something with useful features like DPI switches, user profiles

and extra buttons. Most importantly, it will get you these things from a reputable brand, meaning the mouse won't fall apart or stop working after a couple of vigorous *Call of Duty* sessions.

3 Laptops

Even though the netbook market has pretty much collapsed into nothingness, you can easily pick up laptops for around £150. That would be great if they weren't almost universally terrible. And it's not just the low-powered processors, minimal RAM and low-res screens you need to worry about. You also have to deal with unresponsive touchpads and keyboards that bend when you press down on them. If you just do some occasional typing and web surfing, then maybe they're worth such a small investment, but if you want to do more and you value your sanity, save up and get something better.

4 Flash Drives

This might sound odd, considering how cheaply you can get things up nowadays, but it doesn't pay to be cheap when buying flash drives. Sure, you can get a 128GB drive from eBay for less than a fiver, but do you really want to? Well, that depends on whether you actually like keeping your files stored in an uncorrupted state or not. If you're not going to be storing things for long, then maybe it would be worth getting a few cheap drives. Be aware, though, that if they do break for no reason, you probably won't get a warranty like you do with some of the better manufacturers.

5 Routers

If you've signed up to a high-speed internet connection and you're lucky enough to get anywhere near the quoted speeds, then there's no point hooking everything up to a wireless router from 2004. Thankfully, most providers will give you a reasonably good router anyway, but some people like to use their own equipment. If that's the case with you, just make sure that what you're using doesn't introduce a bottleneck and actually slow down your network.



▲ Yes, you probably could buy a laptop for this much, but it might not run *Far Cry 4*



The Google Nexus 5X

Mark Pickavance looks at the more affordable of the two official Google phones, which has just seen a price drop

I really wanted to cover the Nexus 5X when it first launched in September 2015, but a combination of circumstances contrived to scupper me at every turn. However, my patience has been rewarded in several ways, not least that Google recently dropped the price of the 16GB model to £299, and 32GB version to £339.

When you consider the hardware in these devices is actually better than many premium priced phones, it became an offer I just couldn't refuse.

At the time of writing, Google was also offering a free Chromecast worth £30 and £20 credit for the Play store, further eroding any resistance I might have to buying this phone.

Bludgeoned by these temptations, I eventually succumbed and ordered a 16GB black Nexus 5X that arrived just two days later, along with a £15 bumper cover I'd decided to get. In retrospect, if I'd waited for the credit code from ordering the phone, I could have had the cover for free.

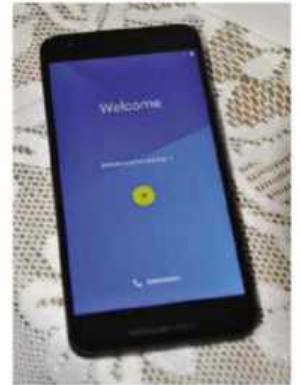
Some people might wonder why I didn't get the 32GB model, but my own experience is that I don't keep large amounts of data on my phone, and I've previously had no real issue with a 8GB models.

Actually, the whole buying saga is something I'll cover elsewhere, because what I really want to talk about is the Nexus 5X and why you might want one.

New Toys

What I don't intend to do in this feature is crawl through the innards of this device, saying what's new and how it directly compares with other phones you can buy. I've included a hardware breakdown that you can read at your leisure, but what I'd like to concentrate on is what makes this phone different from other Android devices you can purchase today.

Unpacking the Nexus 5X, two things struck me immediately, the first being that at a snip under 15cm, this is a big phone that would have been classed as a 'phablet' a couple of years ago. The second notable aspect is while it's large, it isn't heavy, weighing in at just 136g.



In the box with it is an offer for Google Play access, a charger and a small tool for accessing the SIM tray. Initially nothing remarkably there, I thought, until I noticed that the charger and its associated cable are the new USB Type-C standard.

Having used the phone for a couple of weeks now, I can state that this is one of the best features, even if it doesn't really allow you to borrow another charger in a pinch.

This port not only makes sending files over from a PC significantly quicker, it also allows the Nexus 5X's battery to be totally charged in around 100 minutes. And the port also supports reverse charging, so a fully charged phone (tablet or laptop) can be used to charge another device.

The only downside to the Type-C connectivity is that the charger also has one of these ports as standard. This allows the cable to be reversible with the phone, but it also means that unless you have a PC with a USB Type-C port on it, you'll probably need a USB Type-C to USB standard-A plug cable, for which Google would like another £10.99.

It also makes a converter that allows any standard USB device plug into the Nexus (also £10.99), and two adapters that enable you to get video output from the phone to either HDMI or DisplayPort, each for £32.99.

The standard charger is a 15W model that is designed for a single phone, but it does make a 22W variant that can charge two devices, and a 60W universal charger

designed for much larger devices, tablets and Chromebooks, which also use the Type-C standard.

More about power use later, but thankfully the device came with at least 60% battery, and I was able to push on and start personalising the device right away.

All New Android

Powering up the Nexus 5X for the first time, there's a new animated Android logo to entertain, before it drops into what

If you ignore all this, you can get to the Google account phase, and after achieving that, you can choose to copy from any devices associated with that account and sync with virtually any prior Android version.

After this, the phone went on the typical rampage where it attempt to install 30-odd applications while moving all your personal data over, while also in this case downloading a system update from 6.0 to 6.0.1.

“ You'll probably need a USB Type-C to USB Standard-A Plug Cable, for which Google would like another £10.99 ”

looks like the same initialisation routine that's been around since KitKat.

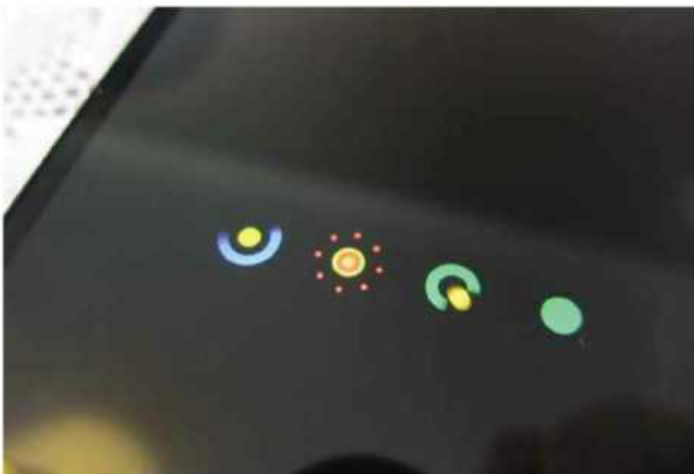
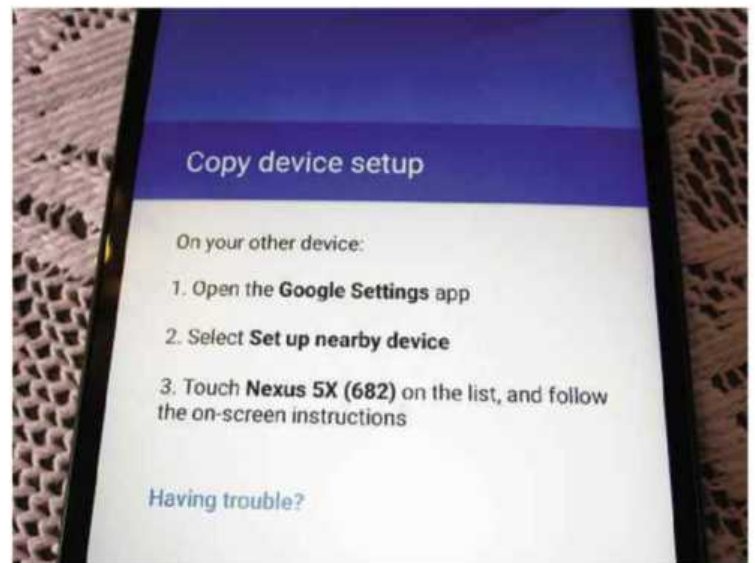
Why the phone assumes we're all Americans, I've not idea, but it must please those on the other side of the Atlantic. At this point I hadn't installed my SIM, which is my preferred choice, but perhaps if I had it might have worked out that I wasn't anywhere near the USA.

Then the normal routine went off on an excursion where it asked me if I was transferring from another Android phone, and then it gave me some instructions that only work on Android 6.0, just to confuse the non-technical user.

With the 802.11ac wi-fi support and fast broadband, this didn't take long, and very soon I was able to get more familiar with what had changed from Android 5.1.1 to 6.0.1, aka Marshmallow.

Initially I thought very little, but lots of minor alterations started to grab my attention, especially those to do with Google Now. That's been added to the lock screen, along with a button to access the camera immediately.

Once past the lock screen, the first major change I encountered was that the home screen by default only has a single page, and sliding it to the right reveals



a Google Now feed. This seems similar to ways that both Samsung and HTC both modified the UI, neither of which I personally appreciated.

Thankfully, you can dispatch this approach and return to a more conventional layout, and you can also add extra home screens if you're a fan of widgets.

One new twist I especially liked was that if you have an app that's on the home screen and you decide you don't want it any more, you can choose either to remove the icon, as before, or actually uninstall the app directly from there.

Google Now On Tap

As we've progressed through KitKat and Lollipop, the importance of Google Now has been elevated. Whenever you're using the phone, Google Now is listening, and the range of commands and words that it understands are extensive.

Google's search possesses more than just the ability to answer questions, though. Now you can run apps, call

people, dictate messages and generally operate your phone with just your voice.

Also, on this device, Marshmallow has a whole new level of capability that Google calls 'on Tap'. If you're not prepared for it, this can take the whole 'second guessing' aspect of Google Now to a new level of creepiness. However, you do have to intentionally activate it in this instance, so there is some degree of control.

What it does is allow you to call on Google Now in any app, and the software will scan what you're looking at (email, YouTube, a picture or whatever) and provide relevant search information based on that.

For example, if you're reading an SMS message about meeting at the train station, this feature could automatically bring you map navigation to the nearest railway or warn you that it conflicts with a prior engagement.

Exactly how you react to this will depend on how comfortable you are with Google knowing large amounts about your life, work, relationships and friends.

It certainly goes beyond the party tricks that Siri and Cortana can do, as it's baked into the Android OS at a much deeper level.

To enable this functionality to be even better, Google has built a whole Voice API that apps can plug into, allowing almost any tool to be voice controlled, and if designed with that in mind, they can use the API to talk back to you.

Activating On Tap is simply a matter of holding down the home button, and it will leap into action for those prepared to have an excessively well-informed digital personal assistant.

It might be worth considering that when our machine overlords eventually take control, they'll know how compliant you've been. Just saying...

Security

Confusingly for users, there appears to be a war on encryption being drummed up in some quarters that should know better. But as phone devices go, the latest Nexus phones do have some neat security



features that should, in theory, keep their devices relatively safe from all but the most professional device hijackers.

Up until this point all security updates have been delivered with system updates, but now they come independently through a new secure mechanism.

Device encryption arrived first with Lollipop, but under Marshmallow the phone is fully encrypted by default, much I presume to the annoyance of those in the security services who like to snoop on us.

Therefore when the phone is locked, it's reasonably secure, and therefore much effort has been put into the locking mechanism and additional layers of security that you can apply to it.

Most people expect pattern, PIN and password locking, but to those the Nexus 5X and 6P add a dedicated fingerprint reader that is required to be used before any of those extra inputs.

The sensor for that is on the rear of the phone below the camera, and you can initially confuse the two. However, it didn't take long for me to get used to it, and it will read a finger very quickly once on the sensor.

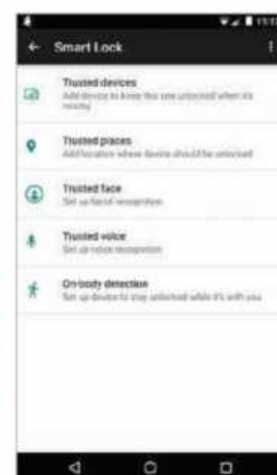
But you can go beyond even that and create lock scenarios where the phone can only be accessed at specific geographic locations, when it sees a friendly face, hears a friendly voice or when it can sense a Bluetooth device (like Google wearable tech) or even on a pre-defined wi-fi network.



This is called 'Smart Lock', and you can make it as specific as you like, depending on what level of paranoia you're experiencing at any particular time.

In addition to disabling access to those who might have stolen your phone, this functionality also links to a set of features that enable the device to be sandboxed for BYOD (bring your own device) situations, enabling the phone to be inherently more secure at work than it is at home.

Another off-shoot of the high security and a feature that you can use specifically with the fingerprint reader is the Android



Built around the Sony's Exmor IMX377 CMOS image sensor, it has 12.3MP capture resolution that seems well suited to indoor photography, using relatively large 1.55-micron pixels to gather as much light as possible.

That's exactly the same sensor in the 6P, but having extra processing power has enabled a few video options on that phone that the 5X isn't blessed with, like 240fps video.

That said, it can capture 4K resolution video at 30fps, or 1080p video at up to 120fps (slow-motion). There's a laser autofocus system and dual LED flashes,

“ **The first Nokia I had nearly 20 years ago offered 650 hours standby, but modern smartphones make that era seem like a distant memory** ”

Pay functionality. However, it isn't available in the UK, and although Google has suggested it will be here in 2016, it hasn't said exactly when. That Australia is on Google Pay already suggests that bringing this technology to the UK might have run into some sort of legislative roadblock, unfortunately.

But should Google unblock this obstruction, the 5X is ready to sanction payment with your fingerprint.

Camera

The rear camera in my old Nexus 4 isn't up to much, when compared with the ones I've used in recent flagship phone designs. But the one in the Nexus 5X is rather nifty, even if it doesn't have optical motion compensation.

and the camera app has been revamped to include HDR+, among other special modes.

I like some of the new ease-of-use features in both the app and added to Android. While using the phone, you can double-tap the power button, and it immediately takes you into camera mode, and when you're there, a single swipe sends you from still to movie and back again.

Specifications and good software design are useful, but what really convinced me that the 5X makes a major step forward in picture quality was some of the images I captured using it. Where I'd normally deploy my trusty Canon Ixus for close-up product shots, the Nexus 5X is more than capable of doing that job and providing me with sharp and well-saturated pictures.



I've included a few here for you to better appreciate. I'm sure that there are phones with even better cameras, but the one on the Nexus 5X is rather good.

Power Management

The first Nokia I had nearly 20 years ago offered 650 hours standby, but modern smartphones make that era seem like a distant memory.

Looking at the specifications, you might conclude that the Nexus 6P got the better deal with a 3450mAh battery, rather than the 2700mAh battery in the Nexus 5X. That's more than 20% extra for the 6P, although it has an octo-cored CPU and a much higher resolution display to blow that power budget on.

What they both have to extend battery life is both specialised power management silicon and the introduction of 'doze' mode into Android 6.0.

The purpose of these features is for the phone to be more aware of what it's doing – specifically when you've put it down and therefore don't need high-demand applications draining your power.

How well this works is well demonstrated by leaving the phone overnight without charging – something that I wouldn't recommend on most phones. Typically, they're at least 15-20% light of their charge by morning, whereas the Nexus 5X was usually 1-2% down at most.

If you resist the temptation to play games, a single 100% charge can last for several days – something I hadn't experienced for some time.

Other tweaks to do with the display also enhance power use. Picking up the phone, it will normally display a simple lock screen view but in a mono low power display mode. If you then touch the display, it will

keep checking email and social media until you specifically use those apps. It disables automatically while the device is charging, so it might work well for people who leave the phone on their charger for much of the day.

Strengths

There are lots of things about this design I like, but many of them are to do with just

“ Part of me hopes I never get to see the Nexus 6P, because if it's substantially better than this device, then I'll be mortified ”

wake up to add colours, but if you want to just see the clock or what messages you've had, then you've just saved some power.

Where it's less wonderful is with gaming and video playback, both of which burn through your battery life disturbingly quickly.

If you like to watch TV shows on the train, I'd strongly recommend you carry the Type-C charger with you, because you'll need to use it when you get to work.

Probably the best feature is one that you can manually activate called 'Battery saver'.

This gears the phone down to use the minimum power for any task and not to

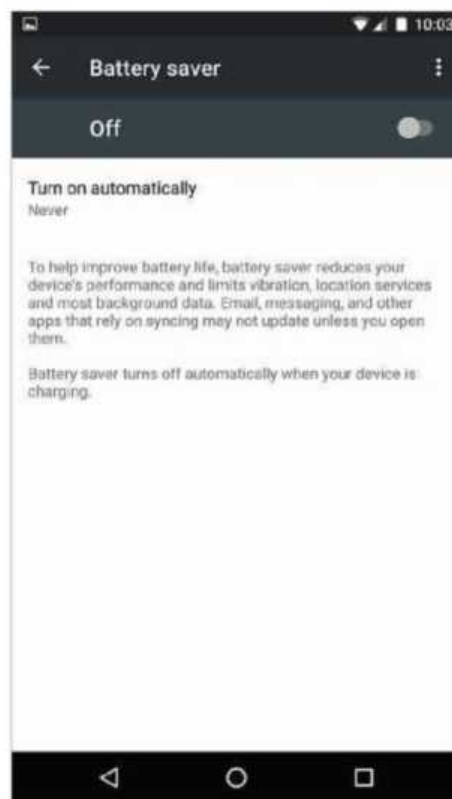
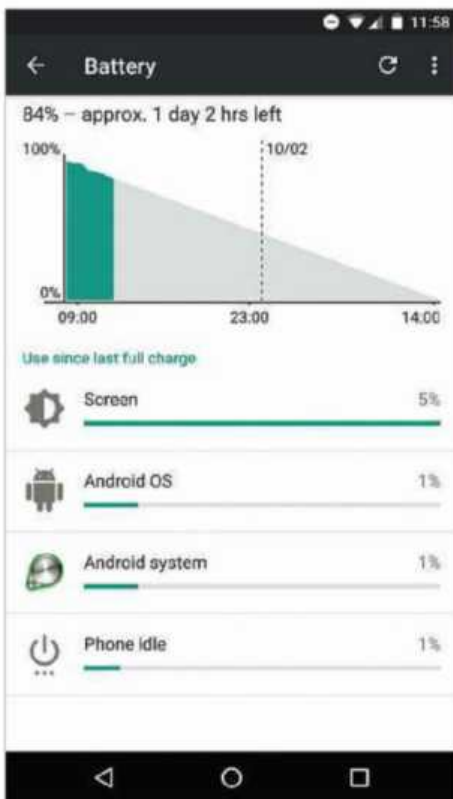
how responsive it is, regardless of what task you give it.

The few benchmarks I ran confirmed that compared with many phones and quite a few tablets, the Nexus 5X is cooking with gas.

In a single task, it's at least 50% quicker than the Nexus 5 it replaces, and 25% in multi-core tests. The results are closer to LG's G4 which, given that it uses the same SoC and was built by the same company, isn't a huge surprise.

Faster processors and more numerous cores are part of the story, but I'd also

THE GOOGLE NEXUS 5X



5X doesn't attempt to be the very best; it's aiming to be good at most things without being the master of any job.

However, one area it firmly wins is the price, being at least £75 cheaper than the 6P when you compare the 32GB models directly.

It's also worth noting that if you look at the recently announced Microsoft Lumia 950, it has a very comparable specification, having the same CPU and GPU, though possibly a better screen. Microsoft is currently asking £419.99 for that phone SIM-free, making it more expensive than the Nexus 6P!

Take a quick look around those phones that are one notch down from the very top, and you'll find many of them are more than £400, even if they're not as sophisticated as the 5X in many important respects.

The combination of power, performance and price is one that is difficult to ignore, if you still think that spending £300 on a phone is acceptable.

Weaknesses

Some people will probably think that the 5X is still too big to be an everyday phone, but for anyone in middle age the extra screen size is invaluable.

However, it's large, and with a very smooth back it could very easily shoot out of an inside pocket if not properly secured. Because of that, a bumper or cover is an absolute necessity, to avoid expensive accidents.

While I really like the Type-C charging, what's less desirable is that the battery isn't user replaceable. In about three years, to my estimation, I'll be sending this away to a specialist to get the

contend that part of this achievement comes down to the architecture of the 5X (and 6P), and how it radically different from any Nexus phone designs that have come before.

In terms of the OS features, being a Nexus it's well insulated from the bloatware that many branded phones suffer from. That leaves more space for user data and provides a generally slicker user experience.

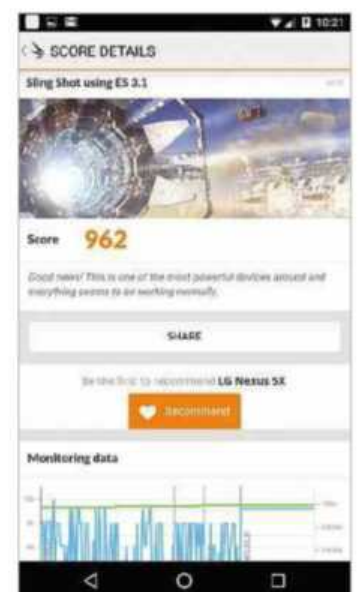
While Android 6.0 isn't a radical departure from 5.0, it does seem less prone to performance-impairing memory leaks or allowing apps to hog resources.

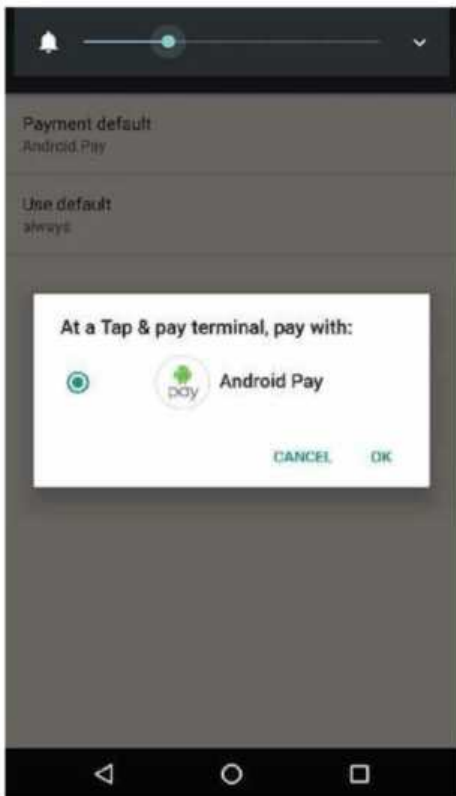
If you compared the 5X with the 6P, it gets beaten on many features but generally by relatively small amounts.

A 1080p display is fine for most uses, and the rear camera can capture some wonderful images even in relatively low light conditions.

In many respects, the Nexus 5X harks back to the original concept of the Nexus One, being a well-balanced platform designed to showcase Android in what is effectively a mutual appreciation society.

There are more powerful phones around, like the 6P, because the Nexus





battery replaced, probably spending more than I'd like to extend its life.

On the flipside of that argument, with the Type-C connection you can get 3.8 hours of use from only ten minutes of charging, so you shouldn't need to charge it as long or as often.

My only regret, moving from the Nexus 4, is the loss of Qi charging. According to Google, it focused on making Type-C as useful as possible, and in doing so sacrificed wireless charging. Google's choice, but I do miss it.

Battery life is good by smartphone standards, but that is somewhat like saying one air tank is better than none when you're underwater. You still really need to charge once a day if you use it more than occasionally, even if the 5X is very good at rationing what power it can carry.

The Nexus 5X And 6P Compared		
	Nexus 5X	Nexus 6P
Phone		
OS	Android (6.0)	Android (6.0)
Dimensions	147 x 72.6 x 7.9mm	159.3 x 77.8 x 7.3mm
Weight	136g	178g
Body material	Plastic	Aluminium
Colours	Carbon, Quartz, Ice	Aluminium, Graphite, Frost, Matte Gold
Made By	LG Electronics	Huawei
Display		
Size	5.2 inches	5.7 inches
Resolution	1080 x 1920 pixels	1440 x 2560 pixels
Pixel density	423 ppi	518 ppi
Technology	IPS LCD	AMOLED
Screen-to-body ratio	70.04 %	71.60 %
Features	Light sensor, proximity sensor, scratch-resistant glass (Corning Gorilla Glass 3), oleophobic coating	Light sensor, proximity sensor, scratch-resistant glass (Corning Gorilla Glass 4), oleophobic coating
Camera		
Rear camera	12.3 megapixels, F2.0 aperture, 1/2.3" sensor size, 1.55 µm pixels	
Flash	Dual LED	
Features	Face detection, self-timer, autofocus (laser), touch to focus, geo tagging	
Settings	Exposure compensation, ISO control, white balance presets	
Shooting modes	Burst mode, high dynamic range mode (hdr), panorama, night mode, scenes, effects	
Camcorder modes	3840x2160 (4K) (30 fps), 1920x1080 (1080p HD), 1280x720 (720p HD)	3840x2160 (4K) (30 fps), 1920x1080 (1080p HD), 1280x720 (720p HD)
Front-facing camera	5 megapixels, F2.0 aperture	8 megapixels, F2.4 aperture
Hardware		
System chip	Qualcomm Snapdragon 808 MSM8992	Qualcomm Snapdragon 810 MSM8994
Processor	Hexa-core, 1800 MHz, ARM Cortex-A57 and ARM Cortex-A53, 64-bit	Octa-core, 2000 MHz, ARM Cortex-A57 and ARM Cortex-A53, 64-bit
Graphics processor	Adreno 418	Adreno 430
System memory	2048 LPDDR3 RAM	3072 LPDDR3 RAM
Built-in storage	16 or 32 GB	32GB, 64GB or 128 GB

Another mistake, in my opinion, was not to give this phone a micro-SD card slot. This isn't just because I wouldn't pay for the 32GB model, but because Google modified Android in version 6.0 to treat micro-SD differently, allowing you to make them dedicated to that specific phone and have their space be merged with the internal storage seamlessly. It seems mildly bonkers that it did that and then made a phone that doesn't allow for micro-SD expansion.

I'm also not overly thrilled about the placement of the headphone jack at the bottom of the phone, which seems an unnatural position to me.

And Google needs to pull its fingers out about Google Pay in the UK ASAP, though that's not specifically a 5X issue.

These are mostly minor points, and so far they haven't massively detracted from what has generally been a very positive experience and a massive leap in capability from the Nexus 4.



Final Thoughts

Part of me hopes I never get to see the Nexus 6P, because if it's substantially better than this device, then I'll be mortified. Looking at the specifications, there aren't many places where it's substantially better, having exactly the same rear camera and sensor array as the 5X.

The cheapest Nexus 6P is also £414, and that's probably more money than I could realistically justify spending on a phone, given that I'm primarily located at home.

My logic in buying this was that it's big enough to replace my tablet along with my phone, thus I've avoided the need for two devices.

It also allows me to see where Google is taking Android, which now seems a very long way from the Éclair and Gingerbread era where I first joined this train.

For Apple's sake, I hope it can convince its users not to try one of these out, because I firmly believe that spending more than £539 on an iPhone 6S could seem excessively indulgent when you can almost have two of these for the same money. That's a battle that Apple is fighting across the board, and one it's not prepared to reduce its massive profit margins over.

As for the Nexus 5X, LG did a remarkable job of putting this together while exploiting the Marshmallow feature set. Where the Nexus 5 and 6 didn't really get people excited about the pristine Android platform, the Nexus 5X has done that again for this reviewer.

My only valid concern is that in two or three years (the realistic lifespan for

Battery		
Capacity	2700 mAh, not user replaceable	3450 mAh, not user replaceable
Technology		
CDMA	N/A	800, 1900MHz
GSM	850, 900, 1800, 1900MHz	
UMTS	B1/2/4/5/6/8/9/19	
LTE (FDD)	B1/2/3/4/5/7/8/9/17/18/19/20/26/28	B1/2/3/4/5/7/8/9/17/19/20/28
LTE (TDD)	B38/40/41	B38/B39/40/41
LTE CA DL	B1-B3, B1-B5, B1-B7, B1-B8, B1-B18, B1-B19, B1-B26, B3-B3, B3-B5, B3-B7, B3-B8, B3-B19, B3-B20, B3-B28, B5-B7, B7-B7, B7-B20, B7-B28, B40-B40, B41-B41	B1-B5, B1-B8, B1-B19, B3-B3, B3-B5, B3-B7, B3-B8, B3-B19, B3-B20, B3-B28, B5-B7, B7-B7, B7-B20, B7-B28, B39-B39, B40-B40, B41-B41
Data	LTE-A Cat 6 (300/50 Mbit/s), HSPA (unspecified), HSUPA, UMTS, EDGE, GPRS	LTE-A Cat 6 (300/50 Mbit/s), HSPA (unspecified), UMTS, EDGE, GPRS
SIM Type	nano-SIM	nano-SIM
Positioning	GPS, A-GPS, Glonass	
Navigation	Turn-by-turn navigation, voice navigation	
Connectivity		
Bluetooth	4.2	
Wi-fi	802.11 a, b, g, n, n 5GHz, ac	
Mobile hotspot	Yes	
OTG USB	Yes	
Connector	USB Type-C (reversible)	
Features	Mass storage device, USB charging	
Other	NFC, tethering, computer sync, OTA sync	
Other features		
Notifications	Service lights, haptic feedback, music ringtones (mp3), polyphonic ringtones, vibration, flight mode, silent mode, speakerphone	
Additional microphone(s)	For noise cancellation	
Speakers	Single front-facing	Dual front-facing stereo
Sensors	Accelerometer, gyroscope, compass, hall, fingerprint (touch), barometer	
Other	Voice dialling, voice commands, voice recording	
Pricing		
	Nexus 5X 16GB - £299 Nexus 5X 32GB – £339	Nexus 6P 32GB - £414 Nexus 6P 64GB - £464

a smartphone these days), technology is likely to have moved on and prices comes down.

Since the 5X and 6P arrived, rumours have circulated that Google wants to do more direct design of the Nexus products, rather than farming them out to the likes of LG, Asus, Samsung or Huawei. When they're replaced, we'll undoubtedly learn more, but I'm not sure what value Google sees in designing phones when there are some very capable companies around that can follow instructions.

Emulating Apple's control obsession won't take Android where most users

would like to see it go, so I hope that this rumour mill is grinding chaff in this instance.

It needs to embrace the many good things that are in these devices, and push ahead to make them even better with the next iteration.

If you want a really good Android phone, don't care for branded bloatware, and are prepared to spend a little extra, then the 5X could be the handset for you.

But you can get a perfectly effective Android phone for less, if you don't normally hang on to your phones for more than a couple of years. [mm](#)

Your Letters

Windows 10 Security

My wife and I recently had cause to celebrate a 'significant occasion' and chose to do this with a spot of winter sun. Now it just happens that this decision coincided with a really good offer for a Windows 10 tablet and, realizing that overseas wi-fi might be of a lower standard to what we are used to in the UK, it seemed like a good idea to set up a clean internet account to avoid bandwidth issues from spam and use the opportunity to find out first hand if Windows 10 is for me. I duly set up an account with Microsoft and set up Skype so that we could keep in touch with our friends etc.

One of the choices Microsoft recommended during this account set-up was to log onto the tablet using a PIN number as this would avoid having to enter my username and password to use the tablet. This seemed to make sense and I went along with it. Having checked to confirm that everything was working and emailing a friend to verify Skype, I put the tablet to one side to keep the machine free from spam ahead of our holiday.

Arriving at our chosen resort a few weeks later, we decided to email our family and friends to let them know that we had arrived safely only to find that we were unable to send emails. It didn't take long to establish that the problem was Microsoft asking me to verify my account with my username and password 'to prevent spam!' Yes, that same password that Microsoft had implied that I would not need (and which I could not remember). Nor could I access my set-up notes at home, several hundred miles away. I didn't see that one coming!

Well, having little to lose, I attempted to remember my password only to find, without warning, Microsoft announcing that my account was now locked and taking me to a website advising me to reset my password. All I needed to do was supply them with my forename, surname, date of birth, country of birth, town where I live, home 'zip' code and a telephone number where they could text me a code to continue. Oh, and they also wanted my Xbox account number, the credit card number registered to this account, a list of people I had emailed from this tablet and a list of folders I had created on this tablet.

Two days later, I was still waiting for a reply. I tried again but this time I offered an alternative email account where they could email this required code. This time they replied telling me

that it would take at least 24 hours to check my details and to their credit, they did reply eventually saying that I had not given them enough personal information to verify my identity and that I would remain locked out of my nice clean account.

Now, I decided that there might be a shortcut here. I found the address of Microsoft's local office and paid them a visit clutching my passport. When I eventually got to speak with somebody, I was told in no uncertain terms, 'We do not provide technical support. Take the tablet to a local computer shop!' They did however give me a freephone number that was not compatible with the local telephone network!

I have no doubt that any law enforcement agency would have no problem confirming my identity. Indeed, I suspect that even Inspector Clouseau could manage it! However, Microsoft resolutely insisted that I provide still more personal information as they were concerned that I might be inclined to distribute spam. However, during this period I received a pile of emails from Microsoft, all unsolicited, with topics ranging from giving them my Facebook details to where I might hire or buy a car.

Finally, consider this: Microsoft assure me that they take extreme care with the personal details of customers. Yet Skype (which is owned by Microsoft) offers the option to 'Log in using my Microsoft account' (meaning that it is not necessary to enter any log-in details) and then click on 'Edit my profile' whereupon anybody using the tablet is presented with a full list of all that precious personal information that Microsoft has been entrusted with!

Under the guidance of Bill Gates, Microsoft grew to be the most valuable company in the world focusing on cutting edge technology. Under Steve Ballmer, who always had one eye on the football, it slid down the rankings whilst trying to reduce everything to a common user experience. Satya Nadella seems concerned that Microsoft should become just another communications company, whilst preventing legitimate users from communicating. It has already lost out to Apple and Android/Google and will undoubtedly sink even lower if it doesn't improve significantly. As for me, I will be using Linux from now on.

John Brockhurst

New Ferrari, Rubbish Chassis?

Recently MM has carried group tests and reviews on 'top-end' gaming desktops from various manufacturers. All these were kitted out with top-end GPUs, top-end CPUs, great HDD capacity and SSDs for speed and quick boot times. Great so far. Then one sees the spec of the motherboard, only to find that – in virtually all instances – it seems to be an afterthought and is very low-end.

Why? I may be terribly wrong, but I thought a top-end motherboard would be a prerequisite to match the expensive, high performance components.

Am I equally wrong in believing that the motherboard is the heart of the machine, upon which, the consistent performance of GPUs, CPUs, PCIe M2 SSDs et al, rely?

Mercifully, for similar money, folk can buy all the top-end components and a great Mob, provided they can or are willing to put the beauty together themselves.

Jim, Scotland

GET IN TOUCH...

By email

letters@micromart.co.uk

By post

Micro Mart
30 Cleveland Street
London
W1T 4JD

Online

forum.micromart.co.uk

Remembering... Virtuality

This week, **David Hayward** recalls the first time VR took off

Since the technology world is awaiting the arrival of the new generation of virtual reality systems, I thought we'd have a quick look back at the first time VR was launched to the public, with the Virtuality 1000-series gaming pods.

The 1000CS was the first time I'd ever used a VR unit, with its large and quite heavy headset visor and backpack, which saw you standing inside an enclosed 'pod'. There was a large ring surrounding you, placed on the pod itself, which contained a magnetic tracking system that would follow the handheld 'space joystick' as you, the gamer, would move around the virtual environment.

It was quite an impressive piece of technology, which weighed around 120kg and cost roughly £30,000 when first released. The machine was powered by a customised Amiga 3000, which had been converted using early LCD technology. The unit was networkable, so you could hook up another 1000CS and play a selection of the games available in either co-op or versus mode.

The unit I got to play on was lovingly restored by Simon Marston and presented at the 2013 Revival event in Wolverhampton. We got to play on *Dactyl Nightmare*, in which you have to shoot other enemies with a grenade launcher, while occasionally avoiding or shooting the giant pterodactyl that swoops in over the game world. I actually managed to shoot it, by the way – the first person to do so in the entire Revival weekend! Not that I'm bragging; it's just nice

to actually beat a teenager in a computer game for once.

Its History

The Virtuality Group was formed by Dr Jonathan Waldren in 1985, experimenting with and eventually producing virtual reality headsets, graphics, trackers and the kit needed to interact with a virtual world.

By 1990, the company was releasing a collection of VR setups in arcades around the world. Starting with the 1000SU, SU for Stand Up, this Amiga-3000-based machine boasted a 68030 processor, 4MB of memory and a pair of TMS34082AGC-32 and TMS34020GBL-32 graphics cards. It cost around £25,000 when it first launched and looked like a futuristic hover vehicle.

The company then followed with the 1000CS, with more games, slightly better technology and a higher price. The 2000 came next, sometime in 1994, and was powered by the cheaper Intel 486 DX-33 processor, a massive 8MB of memory and a customised PIX1000 16MB graphics card. Again, the VR tracking technology was improved, only this time it was sold at a cheaper £10,000.

After that, the company was involved in various VR-based projects on a smaller scale. Sadly, though, the company was broken apart in 1997, and the various rights and technologies were sold off to different parties. However, if you're lucky, you may come across an old Virtuality machine on eBay or at The Retro Computer Museum.

Did You Know?

- As well as *Dactyl Nightmare*, other games included *Grid Busters*, *Ghost Train*, *Pac-Man* and *Missile Command*.
- One of the company's first products was the iGlasses, a VR headset with tracking built in.
- Forte Technologies' VFX-1 VR headset was a direct competitor to Virtuality and a cheaper unit too at just £600.
- Philips bought some of the technology from Virtuality, which eventually became the Philips Scuba Visor.

The Good

Proper VR in an enclosed headset and system, with some excellent games and superb controls.

The Bad

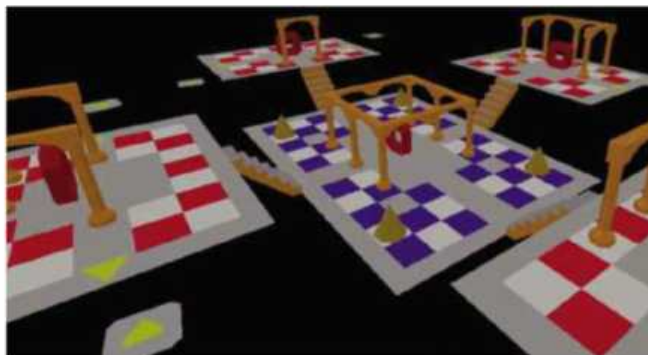
Extraordinarily expensive, difficult to get parts for and from what we've heard in the past, a little finicky to get running at times.

Conclusion

The next time you're wearing a modern VR headset, remember those pioneers who tried the first time around to get VR to the masses. And spare a thought for those who keep the dream alive through their hard work and patience.



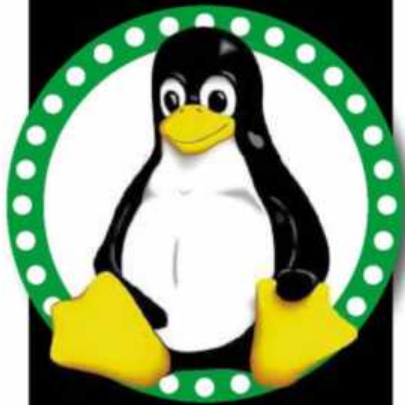
▲ *Dactyl Nightmare* on the 1000CS was an amazing game to play



▲ The original mid-90s advert for the 1000CS



▲ My friend Amy, on the Virtuality machine at the 2013 Revival event



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

A Dark Day For Mint

Linux Mint downloads hijacked

By the time you've read this, the smoke will have cleared somewhat with regards to what's happened over at the Linux Mint HQ. Since I'm writing this now, as it has happened, here's what's going on.

According to Clement Lefebvre, the head of the Linux Mint project, the sever where the Mint .iso files were hosted was hacked, and instead of pointing to the downloads of the distro, the links were looking at a customised version of Linux Mint.

The customisation, it appears, contains a backdoor and is limited to the latest version of the Cinnamon release – both 32-and 64-bit versions. The hackers, apparently, took over the WordPress CMS where the links are stored and redirected them to the version that contains the backdoor. Lefebvre has also added that the attackers have obtained a copy of the database of forum usernames, encrypted passwords, profiles and emails.

What To Do?

As you would expect, the safest bet is to change your Linux Mint forum password as soon as possible. While the attackers may not be able to crack the encryption, it's not worth the risk. Also, if you've used that password for other sites, then it's probably best to change them too, since the emails have been hacked too – as far as we know, anyway.

What's The Hack?

The backdoor was added to the Mint image and connects the user to a Bulgarian domain called absentvodka.com. It can be found in the man.cy file under the Char *servers section as follows, along with some other instances of sites:

```
#define STARTUP 1
#undef IDENT
// Only enable this if
you absolutely have to
#define FAKENAME "apt-
cache" // What you want this
to hide as
#define CHAN "#mint" //
Channel to join
#define KEY "bleh"
```

```
// The key of the channel
int numservers=5;
// Must change this to equal
number of servers down there
char *servers[] = {
"updates.absentvodka.com",
"updates.mintylinux.com",
"eggstrawdinarry.
mylittlerepo.com",
"linuxmint.kernel-org.org",
"updates.absentvodka.com",
(void*)0
};
```

Obviously there's a lot more to it, and those who know their code far better than I can have a browse of it on GitHub at [goo.gl/n9tTfg](https://github.com/n9tTfg).

A Wounded Mint

While this may have wounded the Mint project, it's only a slight abrasion to the project's good name. Anyone who has a Cinnamon release before 20th February is perfectly fine, and the issue was soon resolved and sorted, and the correct links re-established.

No doubt, the anti-Linux crowd will love this bit of news, but who cares about them? However, there do seem to be more and more Linux attacks of late. Perhaps we're seeing a new generation of attackers surfacing, bored with the easy prey of Microsoft and focusing their attention on Linux?



◀ Linux Mint is on the ball, and all should be okay now

Shadow Of The Beast XXV

by CoLD SToRAGE



Sven Harvey listens to a new audio release

DETAILS

- Price: £9.99
- Website: coldstorage.bandcamp.com
- Required Spec: anything that can play MP3s

Tim Wright has decided to release an enhanced version of the (CoLD SToRAGE) Vs. David Whittaker Shadow of The Beast 2015 Remix Album. This follows the release of the original backer-only version, which came in the form of a pressed audio CD. As you might remember, this CD came with *Commodore Amiga: A Visual Compendium*, which Bitmap Books' funded through a Kickstarter campaign. The new release, however, will be available to the general public in a digital format only.

Available from Bandcamp, this includes the tracks from the CD sent out to the Kickstarter backers, but at 53 minutes, it also includes two bonus remix tracks. All the tracks are remixes of the music from the original *Shadow Of The Beast* game (1989), though the remixes are quite eclectic in style, as you can probably tell from the track listing.

As I have come to expect from Mr. Wright, the music is fantastic, though I get the feeling some potential listeners may not be huge fans of all the styles of the remixes. The C64 one, for instance, might

well divide opinion, and yet it's one of my favourites.

Owners of the original CD issue don't have much of an incentive to buy this digital album, in all honesty, and I hope a way can be found to make the two bonus tracks available to the Kickstarter supporters.

It's a fantastic album, and this is the only way to get hold of it for those not on the backers list. Check out the previews of the tracks at Bandcamp for a taste!

Track List

- 1: Pipes Of The Beast – Big Band Mix
- 2: Castle – Burger Bar Mix
- 3: Funeral – True to Life Mix
- 4: Shadow Theme – Fat C64 Mix
- 5: Plains Attack – The Funkdelic Mix
- 6: Plains – The Chinese Orchestra Mix
- 7: Plains Attack – The Smoov Mix
- 8: Shadow Theme – Grand Flutes Mix
- 9: Plains Exploration – The JKM Mix
- 10: Water Boss – Stadium Blast Mix
- 11: Underground – The 80's Greyscale Mix
- 12: BONUS – Water Boxx – DIGI Mix
- 13: BONUS – Castle – Dark Nudge Mix

Dave Needle

It is with regret that I relay to you that Dave Needle, one of the core hardware team on the original Amiga Lorraine project, which bore fruition in the machine we call the Amiga 1000, died on 20th February.

After joining the original Amiga company as a janitor to get his foot in the door, as it were, Dave ended up developing the Agnus custom co-processor and the system boards, making him instrumental in the completion of the original Amiga computer. Not bad for the chap with the broom who was giving the original design engineers suggestions.

After leaving Commodore, Dave worked with R J Mical on the machine now known as the Atari Lynx and the 3DO, becoming vice president of the 3DO company.

Dave is still due to appear in the *Viva Amiga!* and *From Bedrooms To Billions – The Amiga Years* video productions, due out this year, after his attendance at the USA Amiga30 event last year.

Our thoughts are with his family and friends.

➤ Some of the Amiga development team in 2007, Dave Needle is kneeling to the right



Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

Amiga



Ian McGurran is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Insecurity Measures

When is encryption not secure? Ian McGurran shares his thoughts this week

It's quite a familiar case to those who follow current affairs: the request from the United States Federal Bureau of Investigation to unlock and decrypt the iPhone 5C that belonged to a now-deceased gunman in what has been classed as a terrorist incident. The FBI wanted to look into the shooter's online history in the course of its investigation, but since version 8, iOS encrypts all a device's data, and without the password to get into the device, there was no way to get the information. As the usual methods of extracting the password from the device owner was not possible, given the owner was killed in the incident, the FBI has asked Apple to create a version of iOS that would disable features to allow entry to be gained. Apple, contrary to what many have imagined post-Snowden, has flatly declined to do this, further stating that the tool does not exist, nor will it ever.

Not surprisingly, this has divided opinion greatly. The FBI has gone further to ask the US Department of Justice to force Apple to create this unavailable tool, under a 1789 law, the All Writs Act. Apple has steadfastly refused, citing that as soon as a tool such as this comes into existence, it renders the encryption of the iOS platform redundant. With personal data security a legitimate paramount concern for many users of smartphones, Apple would no longer be able to say that their devices could never be compromised, which

could therefore harm its brand standing. Conceivably, the tool could leak from the hands of the FBI or Apple in to the public domain, rendering millions of devices – personal and enterprise – vulnerable.

Ironically, it appears that part of the process may have been mistakenly hampered by the authorities themselves. The phone in question was owned by the gunman's employer, the San Bernardino County government. At the request of the FBI, the attached iCloud password was reset to enable access to it, a reset that caused a mismatch with the password stored in the phone, preventing it backing up automatically to iCloud. Finding the iCloud account held little of note, the FBI's attention turned to the iPhone. The irony is that had the password not been changed, the backup would have taken place and Apple would have allowed access to that which is stored unencrypted on its servers and not encrypted on a device.

It's not just in the USA where this kind of access is being requested. The recent Investigatory Powers Bill (he so-called 'snooper's charter') has requested access to the personal data of internet users, with organisations, such as the National Crime Agency, saying that being able to search a missing child's web history would give much more insight into their life and could result in them being found before harm comes to them. That's a powerful image, and it isn't inconceivable that this scenario could occur.

The debate is whether that's enough reason to infringe on all citizens' private data.

Like the NCA, the FBI and the DoJ may well have honest and good reasons to want to gain access to this device. But it will set a legal precedent, making not just this device, but every device, somewhat at odds with the right to freedom and privacy. It may also be the case that, while those wanting the access now do it with very good reason and with honesty, there are factors such as a change of government or a huge hack or leak that could mean data becomes compromising to a person later in life. With data no longer just affecting your computer or your phone, but also your watch, even your TV and your heating system, it's a question that will rumble on and on. With major technology companies such as Apple and Google standing their ground for a plethora of different reasons, and then industry heavy hitters like Bill Gates making a case for capitulation in some cases, the debate will continue to elicit very much divided opinions.



Ride All About It

Andrew Unsworth checks out AMD's virtual reality news

Virtual reality has been in the news a lot over the last 12 months plus, and especially in the last week, due to the Mobile World Congress show in Barcelona. However, one virtual reality news story you might not have come across concerns AMD and its partnership with the Associated Press (AP) to bring 360° virtual reality journalism to the masses.

It seems AMD and AP hope to immerse the viewer in the middle of an unfolding story and better understand the situation in which journalists have found themselves. Thinking ahead, this could usher in a new age of news, where viewers can experience the chaos and unpredictability of a mob running wild during a riot or view the devastation caused by severe flooding or earthquake.

This new venture is made possible by AMD's LiquidVR software development platform, which AMD says "enables immersive VR performance that maintains reliable VR comfort and is designed for plug-and-play compatibility with VR headsets". You can check out AP's new virtual reality channel at www.bigstory.ap.org/VR360. More info on AMD's LiquidVR can be found at <http://tinyurl.com/n8stn43>.

Virtual reality journalism sounds like a great idea, but I'm sure it only works if the journalist in question is of the hard-faced, intrepid variety. I'm not sure it'll work for denizens of the MM Shed, unless our readers really do want to see a bunch of hairy blokes sitting round in their pants, staring blankly at an empty Word or InDesign document.

TomTom Rider 410

It may come as a surprise, but TomTom has been making satnavs for motorcyclists for ten years. To celebrate ten years of helping bikers to get from A to B, TomTom has released the TomTom Rider 410, which adds lifetime world maps (the Rider 400 has lifetime European maps) among other features.

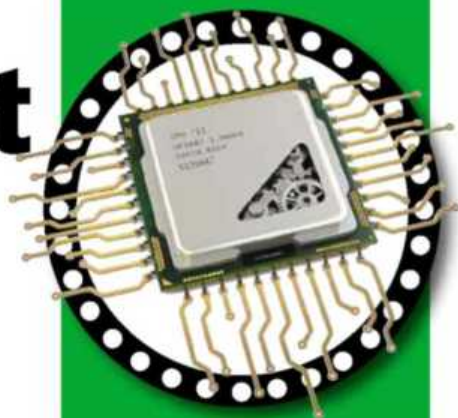
Bikers will also be able to use the Rider 410 to accept calls, transfer files via Bluetooth and listen to instructions through a Bluetooth headset. Even better, the Rider 410 comes with 100 of "Europe's most thrilling routes" preinstalled, just in case the user needs a bit of inspiration or simply wants to try a new route. Users can choose the type of ride they want, such as a winding road or a hilly one, so there should be something to suit every mood.

According to TomTom, "Users can gain inspiration from riders in the know and create their own thrilling routes on their computer, before uploading them to the Rider device via MyDrive."

Having been heavily into mountain biking in my youth, when I lived up north, I've always fancied myself as a biker. I'd still love to have a crosser or a trial bike even now, even though the sight of a fat, middle-aged and leather-clad man tackling the local slag heaps would be as cool and exciting as watching an amorphous lump of ice cream rolling down a soggy sand berm in February.

For those of you who prefer on-road biking to off, the Rider 410 could be a good way of improving the comfort, efficiency and safety of your rides. Indeed, TomTom claims the Rider 410 has a "glove-friendly, waterproof screen that responds instantly to touch", which is surely of vital importance if you're exposed to the elements.

If you want to invest in a TomTom Rider 410, I'm afraid you'll have to wait until 8th April. I don't have prices at the moment, but the Rider 400 costs £320 (tinyurl.com/hr6tbm5), so I'd expect the Rider 410 to cost the same or more.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner and his handshaking skills are second to none

Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming

The Impending Doom

Id Software's Doom revival will include a single-player campaign lasting around 13 hours depending on difficulty level, the studio has revealed

This week, Ryan gets all excited over Doom's 13-hour solo campaign and takes a look at the latest reports from Blizzard's online shooter Overwatch...

Plug & Play

"We are storytelling creatures and we look for the narrative in everything," award-winning writer Rhianna Pratchett recently said at a conference in Las Vegas. "Gameplay might engage the mind but it's story that engages the heart."

Or to put it in a less educated way, single-player campaigns also give the less gifted players among us the chance to exercise our trigger fingers without being repeatedly killed by complete strangers. And for those of us who still love a dose of narrative in our first-person shooters, it's heartening to hear that Id Software's forthcoming *Doom* revival will come with a single-player outing, which, if a February tweet is anything to go by, should offer plenty of bang for our buck (or 'plosions for our pounds in old money).

When asked via Twitter how long *Doom*'s solo mission would be, Id replied, "The difficulty level plays a factor, but folks playing at the office average 13+ hours in the campaign."

Now, 13 hours might not sound like much when thrown up against, say, *Fallout 4*, but given the relatively anaemic solo missions in the *Call Of Duty* series – which can sometimes

be blasted through in anything from six to ten hours by more skilled players – 13 hours starts to sound like pretty good value. In recent weeks, some PC users have also begun digging through *Doom*'s alpha code for clues as to what's in store in the finished game; information published on such sites as Imgur and NeoGAF suggest there'll be 17 missions and more than a few familiar (and hideous) faces; references to Cacodemons, Cyberdemons, Revenants and Hell Knights have all been found lurking in *Doom*'s code. We'll have to wait and see whether the clues found in the alpha build really reflect the content in the final build, since it isn't uncommon for developers to leave bits and pieces from unused ideas and characters lying around in their games. But for now, it really does look as though Id's following through on its intent to make a game that remains true to *Doom*'s 90s roots. The series may not have the kind of storytelling depth we get in more modern, sophisticated games (it's basically space marines versus a cornucopia of hell-beasts), but it's refreshing to see Id place almost as much emphasis on solo thrills as online, competitive play.

Doom is out on 13th May.

Online

As if the notion of a competitive shooter from Blizzard doesn't sound enticing enough, there's also the stated aim of game designer Chris Metzen to consider: "Is it even possible to build a shooter that doesn't feel cynical, that doesn't feel cruel, that doesn't feel nasty?"

Thus, from the ashes of the aborted *Project Titan*, *Overwatch* was born. An online FPS that's about teamwork rather than racking up kills, it's shot through with the colour and larger-than-life character design we've come to expect from the maker of *Diablo* and *Warcraft*. The long-in-gestation project is now nearing its scheduled launch window, which means that Blizzard has been using the past few months of beta testing to make the usual balance fixes based on players' feedback – one of the major things flagged up so far being that the characters Bastion and Torbjorn are somewhat over-powered. Although the two heroes look very different (Torbjorn is a bearded dwarf, Bastion is a big robot), they both specialise in using automated turrets – and those turrets, players have complained, are a bit too accurate for comfort.



▲ *Blizzard is hoping Overwatch has what it takes to join the firm's pantheon of greats including Warcraft and Diablo; the finished game is scheduled to launch in the spring*

These are just the kinds of things beta phases are designed to wrinkle out, of course, and *Overwatch* game director Jeff Kaplan has already pledged to make Bastion and Torbjorn less Terminator-like in their abilities. "Our goal was to make these Heroes more viable in high end play and less of a threat in low end play," Kaplan wrote in a recent forum post. "We obviously failed on the latter and are going to try a few changes over the coming weeks."

Recent weeks have also seen a new addition to *Overwatch*: loot boxes, which can either be earned or paid for with real-world cash. Unlike so many other online shooters released of late, *Overwatch* will be a full-priced game costing about

£30 for the basic PC edition. Refreshingly, Blizzard has stated that the heroes and maps coming out in the months and years after release will be free to download, which at least means players won't have to shell out on DLC packages every few months.

With those loot boxes, meanwhile, Blizzard will still have an opportunity to boost its coffers. Each loot box contains random items, ranging from spray paint (for daubing the game map in quieter moments), player skins, victory poses and credits. The items in the boxes are all cosmetic, admittedly, but the move has come in for a certain amount of criticism from some users who'd rather, say, purchase the skin they want

rather than pay for a loot box of items they may have no use for.

On the other hand, Blizzard has repeatedly said that it plans to support *Overwatch* with plenty of new content in the future, and that has to be paid for somehow. As one commenter wrote on Eurogamer recently, "I'd rather have everything straight from the start, but if I'd have to choose between evils, I'll applaud Blizzard. This is in-game purchases done right."

Overwatch is due for launch in the spring.

Incoming

At the time of writing, the open beta phase for Ubisoft's big, ambitious shooter-RPG *The Division* is in full swing – giving the game's designers a chance to add a final bit of spit and polish. At the same time, Ubisoft boss

Alan Parkes has been banging the marketing drum for his new game, suggesting that *The Division* could be about to join *Destiny* as the biggest launch ever for a non-sequel game (or "new intellectual property" as posh management-types like to say). The critical reaction to *The Division's* beta phase was certainly positive, albeit with some caveats: enemies are in short supply, they shout 'Alex!' a lot, and they can take a lot of hits to kill given they're wearing hoodies.

The Division certainly looks beautiful, with its disease-stricken, winter Manhattan setting. Exactly how exciting the game is to play – especially in its PvP Dark Zone – will be very much defined by how it goes down with the game-playing public.

The *Division* launches on 8th March 2016



▲ *Ubisoft hopes to rival Destiny with its new, big-budget RPG-online-shooter opus The Division, out on 8th March*

AD INDEX

2/3 CCL	23 Tibo
6/7 Morgan	27 TP-Link
11 Cocktail Audio	31 ITTablet
13 Fasthosts	35 Mesh
17 ShieldX2	91 iiyama
21 Falcon Computers	92 iStorage

To advertise contact :

Joe Teal: +44 (0)20 7907 6689
Joe_Teal@dennis.co.uk

NOTE TO ADVERTISERS

Micro Mart © Dennis Publishing, 30 Cleveland Street, London W1T 4JD. Company registered in England No 1138891. This publication may not be reproduced or transmitted in any form in whole or in part without the written consent of the publisher. Quotations for re-prints or other use of material are available on application.

THE BUSINESS ADVERTISEMENT DISCLOSURE ORDER 1977 (effective from 1st January 1978) requires all advertisements by people who seek to sell goods in the course of a business to make that fact clear. It is the responsibility of the advertiser to comply with the order. Lineage trade ads in Micro Mart carry this *T symbol. It is an offence for which you may be prosecuted not to advertise the fact that you are a trader.

MICRO MART is published weekly by Dennis Publishing. Subscriptions rates available on request. Micro Mart welcomes the submission of articles and reviews for publication. Please enclose a stamped self addressed envelope; otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Dennis Publishing will be on an all-rights basis. Views or opinions expressed by freelance contributors are not necessarily those of Dennis Publishing. Advertisements and goods/services offered are the sole responsibility of the particular advertiser and Dennis Publishing cannot be held in any way responsible. Whilst every care is taken the publishers cannot be held legally responsible for any errors in articles or advertisements or any resulting unsatisfactory transactions. We will however investigate incidents on a written complaint. © Dennis Publishing 2006. This publication may not be reproduced in or transmitted in any form in whole or in part without the written consent of the publishers. ISSN 956-3881. Blimey.

**'THE BEST BOOK EVER WRITTEN
ON HOW TO GET RICH'**

J. Disorobo, Amazon.com

This is a book about getting rich.

**It's different from any other book
on the subject because Felix Dennis
made himself rich.**

Very rich indeed.

**And now he's going
to show you how
to do it!**



THE CRITICS

**'If this book doesn't
get you rich, nothing
ever will'**

Mail on Sunday

**'Well-founded advice
based on hard-won
experience'**

Financial Times

**'Full of honest insights.
I strongly recommend
this book'**

Sunday Telegraph

THE READERS

'An inspirational book'

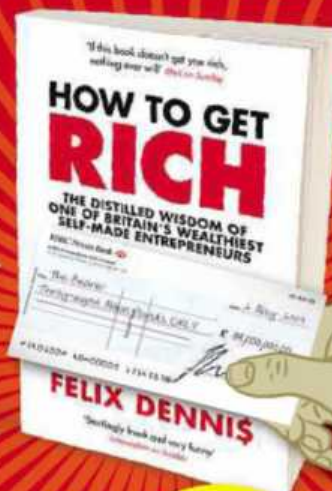
Alan Bates, Amazon.co.uk

**'Essential reading.
A great work'**

Tom Rubython, Amazon.co.uk

'A true masterpiece'

The Wanderer, Amazon.com



**PAPERBACK
EDITION
OUT NOW
£7.99**

**AVAILABLE NOW AT BORDERS
AND ALL GOOD BOOKSTORES**



www.randomhouse.co.uk/howtogetrich
www.felixdennis.com

**'WISE, FEARLESSLY FRANK
AND TRULY INSPIRATIONAL'**

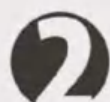
Mail on Sunday

FREE Private Classified Adverts



ONLINE

Visit our website, register and submit your classified advert at www.micromart.co.uk
Your advert will not only appear in our magazine, but be live on our website too!



POST

Simply fill in the form & post to:

Emma Corbett, Micro Mart, 30 Cleveland Street, W1T 4JD

◀ **NEW ADDRESS!**

Step 1

Write the wording for your advert in the numbered boxes below (one word each box). Maximum 30 words free.
Please complete in BLOCK CAPITAL LETTERS, then proceed to Step 2

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60

30 Words FREE Private Ads Only <small>(Trade ads MUST be boxed or reversed)</small>	Boxed		Reversed	
	Private	Trade	Private	Trade
	£6.80	£13.60	£8.00	£16.00
£1.70	£8.50	£17.00	£9.70	£19.40
£3.40	£10.20	£20.40	£11.40	£22.80
£5.10	£11.90	£23.80	£13.10	£26.20
£6.80	£13.60	£27.20	£14.80	£29.60
£8.50	£15.30	£30.60	£16.50	£33.00
£10.20	£17.00	£34.00	£18.20	£36.40

Step 2

Choose a category you would like your advert to appear in and tick the box.

- ☐ Hardware for sale ☐ Software for sale ☐ General for sale ☐ Accessories
☐ Hardware wanted ☐ Software wanted ☐ General wanted

Step 3

Complete all fields of your personal details and payment method.

Name

Address

Post Code

Landline Telephone No. Email

If I have more than 30 words, I have enclosed due payment. I am not advertising pirated, pornographic or any other kind of illegal software and my advert is both honest and legitimate. MM reserves the right to refuse or alter adverts at the discretion of the management. MM cannot be held responsible for the condition or quality of goods advertised. Your advert will be processed on receipt and will appear a.s.a.p. subject to space and availability.

Please tick appropriately ☐ Private ☐ Trade

I enclose payment by ☐ Cheque ☐ Postal order

or please Debit my Mastercard/Visa/Amex account No

Expiry Date:



FAX this completed form to: 0207 907 6066

Authorise payment for £

Please Note: The standard Micro Mart conditions of advertising acceptance apply to all classified advertisements. Cancellations and amendments are not accepted to free ads. The publishers may refuse any advertisements and cannot guarantee insertion into any specific issue. Dennis Publishing will use your information for administration and analysis. We may share your information with carefully selected 3rd parties. We, or they, may send you details of other goods or services which may be of interest to you. The information may be provided by letter, telephone or other reasonable means of communication. If you do not want your details to be shared with carefully selected 3rd parties, please tick here. ☐

IT

Essentials

TO ADVERTISE CALL

JOE TEAL

0207 907 6689

joe_téal@dennis.co.uk

FILCO

The best keyboards in the world.

Available from

www.keyboardco.com

0845 205 5555

**Today's news
today, not a
week later**

- Breaking IT news
- News that matters to UK IT decision makers
- Updated throughout the day



IT news as it happens, online now at
www.itpro.co.uk

micro mart

**Now There Are More Ways Than Ever
To Read Your Favourite Magazine!**



Download the Micro Mart iOS App
tinyurl.com/MicroMartiTunes

**Buy or subscribe using Zinio
on your tablet, mobile phone or PC**
tinyurl.com/MicroMartZinio

Read Micro Mart on Magzter
tinyurl.com/MicroMartMagzter

or you can follow us...

@Micro_Mart

www.facebook.com/micro.mart.mag

Amber

Transforming young lives



Amber transforms lives by offering a fresh start to unemployed, homeless young people seeking direction in life.

Amber builds confidence, motivation and self-belief.

Amber works



**To donate text AMBR03 to 70070 and the amount
or go to www.amberweb.org**

Registered charity number 1051388

To place an ad in our classifieds, simply fill in the form at www.micromart.co.uk or send your ad by post to Maaya Mistry, Micro Mart, Dennis Publishing, 30 Cleveland Street, W1T 4JD

HARDWARE FOR SALE

Have you got old kit lying around? Fancy making a few pounds while you're at it? Why not advertise here? It's easy and it's free, just email what you've got, how much you'd like for it, and your contact details to micromartclassifieds@gmail.com, and we'll do the rest. There are thousands of enthusiastic readers out there looking for components every week, and you may have something unwanted they've been searching for, so get in touch and save your kit from going to the tip!

Ergotron LX Dual Side-by-Side LCD Monitor Arm Model: 45-245-026. Create a fully adjustable side-by-side monitor configuration, suitable for screens up to 24"
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

PS/2 Keyboard These are standard keyboards please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

AT Keyboard These are standard keyboards please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Zalman Z11 SSD 3.5 Inch To 5.25 Inch Converter Tray £5 inc p&p.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Minolta Dimage Scan Dual 35mm film/negative scanner together with AP10 APS cassette adaptor. 2438 DPI. SCSI 2 interface. Working condition. Complete with original software, instructions and cables. £15.
Tel: (02084) 497724
Email: murray.ailes@sky.com

Cisco 4Mb Router Flash Card £10
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Adaptec 2100S Scsi Raid Card With 128mb Ecc Cache Ram Memory Module - £15.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Dlink Airplus G+ Wireless Pci Network Card £15.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

HP PO2015 Laserjet Extra Lower Printer Tray £20.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Desktop Digital Psu Tester. £10.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Intel Wireless PCI-E Laptop Network Card. £10.
Tel: Gary (01415) 712822 or (07941) 486760
Email: gary.gemmell@ntlworld.com

Any distro version 64bit or 32 bit Linux CD/DVD. £12.50 inc postage. Please email or call me for info.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Laptops. Different specs please let me know what you are looking for or what you will be using it for and I will let you know what I have. Please email or call me for info.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

WI-FI wireless pcmcia card will fit in older laptops to enable them to connect to wireless networks £10 +p&p if intrested please email me
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle. Gigabyte GA-M56S-S3 Motherboard, AMD Sempron 3400, 512MB RAM tested and working. £35+p&p. Can be supplied with Coolermaster Tower case and 500W PSU for extra.
Tel: David (01274) 610045
Email: dgaguine@gmail.com

Coolermaster Centurion 5 midtower case. Excellent condition. All front and back blanking plates present. Can be supplied with coolermaster 650W PSU £15 extra. £15.00 +p&p or collect from Bradford WY
Tel: David (01274) 610045 Email: dgaguine@gmail.com

Coolermaster HyperTx2 cooler excellent condition for LGA 775 and AMD AM2/754/939/940 All fittings included. Very quiet. £5 +p&p or collect from Bradford
Tel: David (01274) 610045
Email: dgaguine@gmail.com

Coolermaster 650W PSU RP-650-PCAP. Tested and working, mint condition. Quality Product, SLI certified £15 o.n.o. p&p extra or free collection Bradford WY area
Tel: David (01274) 610045
Email: dgaguine@gmail.com

OCZ stealthstream2 PSU 500W. Mint, very quiet. 20+4pin ATX, 4 Pin CPU, 6+2pin PCIE, 4 peripheral, 3 SATA. £15. p&p extra; free collection Bradford WY area
Tel: David (01274) 610045 Email: dgaguine@gmail.com

Motherboard Bundle 3.2Ghz Intel 64 bit CPU 1GB Ram 2pci-e 2xpci 2IDE 2SATA 8usb ports LAN 6ch sound COMES WITH DRIVER CD AND MANUAL Great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Fractal Design R5 case, with all accessories and original packaging. This is a beautiful bit of kit and a delight to work with, it was only used for a week as it was just too large for my desk. Just £60
Email: rylandp@gmail.com

Retired PC for sale, will split if no taker for whole. Antec Sonata case, Asus P5Q LGA775 motherboard, Core 2 duo E8400 CPU w. Freezer 7 pro (and unused stock cooler), 4GB Patriot PC2-6400 C4 Viper RAM, Nvidia GT 440 1GB GPU. Just £80 plus free LED monitor, keyboard and mouse if collected.
Email: rylandp@gmail.com

Motherboard Bundle 3.5+Ghz AMD 64 bit CPU 1gb Ram (max8gb) 2pci-e 4pci 2IDE 3SATA+ 1eSATA 8usb ports LAN sound Great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

AMD Athlon 64x2 6000+ CPU ADA6000IAA6CZ. tested and working. £15 +p&p £1.84
Tel: David (01274) 610045
Email: dgaguine@gmail.com

Motherboard Bundle 3Ghz AMD 64bit CPU 512MB Ram 5xpci 2xSATA 2IDE 1Gb LAN 6 channel sound firewire COMES WITH DRIVER CD AND MANUAL great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required £35 + p&p please email or call me for more info
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Windows XP pro Computers Fresh install of Windows XP Pro this Computer great for gaming, office work, surfing the net, watching movies generally a good all round system from £100 +p&p might also have laptops price on request please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Brand new Laptop bag still sealed in the plastic bag and never used (it came as part of a bundle) please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Sapphire ATi Radeon HD3850
512MB 256Bit GDDR3 AGP 8x
DUAL DVI/HDTV Graphics
Card to of the range AGP GFX
card i beleve it supports DirectX
10 great for gaming, watching
movies, video editing, CAD/CAM
applications and any other hight
demand gfx programs generally a
good all rounder £80 +p&p please
email or call me for more info
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

2.1 speakers with sub woofer slight
buzzing £25
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Internal 3 1/4 floppy drives choice
of white/black/silver/no face plate
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

WI-FI wireless pcmcia card will
fit in older laptops to enable them
to connect to wireless networks £10
+p&p if intrested please email me
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Brand new Laptop bag still sealed
in the plastic bag and never used
(it came as part of a bundle)
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Windows 7 Computers Fresh
install of Windows 7 this Computer
great for gaming, office work,
surfing the net, watching movies
generally a good all round system
from £150 +p&p might also have
laptops price on request please
email or call me for info.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Internal 3 1/4 floppy drives choice
of white/black/silver/no face plate
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

160GB 3 1/2" desktop hard drive.
IDE and SATA clean pull (little to
no use) no bad sectors tested all
you need to do is plug in. £20 +p&p
please email or call for more info.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Laptop RAM 2x1GB PC3-8500
DDR3 1067MHz pulled form a
working Macbook pro but can be
used in other laptops. The quickest
way to boost you laptop speed
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Retro Win98se Computers
Fresh install of Windows 98SE
ideal for running legacy programs
and for playing older "memory
lane" games as well as for car garage
or industrial use as heavy duty and
has serial parallel ports. from £50
+p&p might also have laptops price
on request please email or call me
for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Fans different sizes and types
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Laptop CPUs mainly intel
different speeds please email or
call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Different types of ram SDRAM
SIMM DIMM DDR DDR2 DDR3
call or email me requirements
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Desktop cases AT and ATX types
and tower and flatbed form factor
different sizes and colors can be
posted or picked up from
Manchester please email or call me
with your requirements for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

AGP graphics cards also PCI and
PCI-e graphics cards please email or
call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle 2.8GHz Intel
32bit CPU 512MB Ram 3x pci
2xSATA 2IDE LAN, sound good
for gaming, office work, surfing,
movies. Generally a good all round
system specm can be changed if
required please email or call me
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle 2.4Ghz
AMD Athlon XP 32bit CPU
512MB Ram 5xpci 2IDE LAN
sound good for gaming, office
work, surfing the net, watching
movies generally a good all
round system spec can slightly be
changed if required please email
or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

PS/2 Keyboard. These are standard
keyboards please email or call me
for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

PC gaming hardware. I have 1x
force feedback steering wheel 1x
force feedback joystick 1x normal
joystick lots of game pads please
email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk
AMD PHENOM 905E. Socket
AM3CPU in perfect working
order and cosmetic condition.
65W TDP, so it runs cool.
2.5ghz. 6mb cache. Bare chip
only. Will send recorded
delivery.£43 inc. postage.
Tel: (02088) 899344
Email: hh872@myopen.ac.uk

As New/Unused PCCHIPS
M811LU R3.1. Box scruffy
but contents are new/unused.
Contents Motherboard/cables et/
backplate/cd driver disk. 7 day
warranty. Socket A/462. £25
including recorded delivery.
Tel: (02088) 899344
Email: hh872@myopen.ac.uk

SSD 120 GB. Sandisk Plus
Solid state hard drive. SATA
3 – 6GB/s. Perfect. Very fast
drive. Only two months old and
never used. Free delivery. PayPal
accepted. £36.
Email: geofry@tiscali.co.uk

RADIOACTIVE FAIR - Civic
Hall, Nantwich, Cheshire,
CW55DG. Sunday 14th Feb
2016. Computers, Electronics,
Ham Radio. ~100 Traders,
Catering, Free Parking. Sun
14 Feb. Trade enquiries, Roger
Reeves
Tel: (07747) 618131
Web: www.radioactivefair.co.uk

Like new hardly used Mac
Mini. 2014, w/ upgraded storage
to 128GB SSD. i5 3rd generation
and 4GB RAM, Optional
Bluetooth keyboard.
£360 text/email.
Tel: (07950) 298812
Email: ghzrepairs@gmail.com

IDE CD ROM Disk Drives
Different colours/white/black
all tested and fully working £10
+p&p please email or call me for
more info
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Floppy Disk Drives different
colours white black silver all tested
and working £10 +p&p please email
or call me for more info
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

PCI GFX VGA cards I got lots of
these of different brands all tested
and working please let me know
what you are looking for I will try
and match up as close as possible
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

NVIDIA AGP 128MB Graphics
Video Card; model number P162
£3 plus postage. (untested)
Email: paulvswells@gmail.com

Sound cards i got lots of these
of PCI and ISA types all tested
and working please let me know
what you are looking for i will try
and match up as close as possible
please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

35x Ram modules: mostly
Kingston 133x64cs 258mb (168
pin) and a few 128mb and 512mb
modules as well. Only £30 inc pp so
less than £1 per module! (untested)
Email: paulvswells@gmail.com

Socket 370 CPUs Intel. I got lots of
these of different speeds all tested
and working please let me know
what kind of speed you are looking
for I will try and match up as close
as possible please email or call me
for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

ATX PSUs. I got lots of these of different types and wattage all tested and working please let me know what you are looking for I will try and match up as close as possible please email or call me for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

AT Keyboard. These are standard keyboards please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Socket 939 CPUs AMD. Four of these of different speeds all tested and working please let me know what you are looking for I will try and match up as close as possible please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

LAN network cards. Various PCI and ISA types wired and wireless all tested and working please let me know what you are looking for I will try and match up as close as possible please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

NVIDIA AGP 128MB Graphics Video Card; model number P162 £3 plus postage. (untested)
Email: paulvwells@gmail.com

Netgear; RangeMax DG834PN & WPN824 routers. No Cables or adaptors. £5 plus postage for the pair. (untested).
Email: paulvwells@gmail.com

D-Link DWL-G510 Wireless LAN 54Mbps Low Pro PCI Network Interface Card £2 + P&P (untested)
Email: paulvwells@gmail.com

HP Compaq NX7010 Laptop. Very good all round condition. Comes with a new charger. 60gb H.D. 2 G.B. Ram. £60.00 o.v.n.o.
Tel: (01726) 61355
Email: arcanu@tiscali.co.uk

Toshiba L450 laptop. 2.1 ghz -2gb ram windows 7 home premium 64bit- plastic backspace button missing £50 inclusive of post
Email: shamashi@hotmail.co.uk

PC Desktop Ram (DIMM) Memory: Siemens PC100 - 222- 620 16M x 64 SDRAM. HYS64V16222GU-8 Only £8.
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com

Webcam (Trust Spacecam). Boxed with CD of installation software and manual. Perfect condition. £10.
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com

20" HP LP2065 LCD monitor. High res 1200 x 1600. Couple of USB 2.0 ports, ideal for connecting a mouse and keyboard. Also has 2x DVI ports. One dead pixel in upper left corner. Hardly noticeable. No other defects. Perfect upgrade from older 17 or 19" model. Just £40!
Tel: Ian Matthew (01132) 629028
Email: ianmatthewuk@yahoo.co.uk
For Sale Laptops different specs please let me know what you are looking for or what you will be using it for and i will let you i know what i have please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Laptop Hard Disk Drive. Fujitsu. 20GB. Excellent condition: £10.00.
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com

Western Digital Cavier SE Desktop Hard Disk Drive 160GB. Perfect condition. Only £10
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Motherboard Bundle 3.33Ghz intel 64 bit CPU 1gb Ram (max4gb) 3pci agp 2IDE 2SATA 8usb ports LAN sound Great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required. email or call for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Toshiba Satellite Pro A210 Laptop. AMD Dual Core 1.90GHz CPU. 3GB RAM. 120GB SSD Drive. Wifi. Windows 7 Ultimate. Office 2007. BitDefender 2015 AV. £95 ovno.
Tel: Paul (01564) 200162
Email: pridding@blueyonder.co.uk

Dell Latitude E5410 i5 (very fast) 2.4, 4gb ram, 160 gb Hard drive DVDRW fantastic condition. Cheaper than any on Ebay. Very good battery life. You can collect from Manchester or Portsmouth or I can courier out to you next day for an extra £10. Please call or email for any questions. It has Window 7 64 bit installed and activated with a genuine certificate of authenticity Bargain price ONLY £124
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Gigabyte Z68X-UD3P-B3 motherboard with Core i5 2300 AND 8GB 1333Mhz RAM. All you need is a HDD, case and PSU. Very reliable. Runs XP up to 10. Drivers included. All for £175!!
Tel: Ian Matthew (01132) 629028
Email: ianmatthewuk@yahoo.co.uk

56kb Fax Modem External. £10.
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com
Laptop DDR2 RAM Just ask what you want pulled from a working laptops this is the quickest way to boost your laptop speed please email or call me for a price.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Brand new USB brackets Add 2 extra USB2 ports to your computer at little cost and very simple to fit cable connect onto the motherboard and uses a spare slot on the back of your computer no drivers required please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Western Digital Cavier SE Desktop Hard Disk Drive 160GB. Perfect condition. Only £10
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com

PC Desktop Ram (DIMM) Memory. Siemens PC100 - 222- 620 16M x 64 SDRAM. HYS64V16222GU-8 Only £8.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Netgear DGND3700-100UKS Gigabit Dual Band WiFi ADSL2+ Router. UK N600 Wireless Gigabit Modem Router. Five Gigabit Ethernet ports, two USB2 ports PLUS an ADSL2+ port. Comes in original packing with Ethernet cable, ADSL filter and cable
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

56kb Fax Modem External. Only £10.00.
Tel: Gordon (01314) 660205
Email: scobie09@gmail.com

HP Photosmart C4585 All-in-One multifunction colour printer. Perfect condition. Includes software and manual. £20.00
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Brand new USB brackets Add 2 extra USB2 ports to your computer at little cost and very simple to fit cable connect onto the motherboard and uses a spare slot on the back of your computer no drivers required please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Laptop Hard Disk Drive. Fujitsu. 20GB. Excellent condition: £10.00.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Laptop RAM 2x1GB PC3-8500 DDR3 1067MHz from a working mac book pro but can be used in other laptops this is the quickest way to boost you laptop speed please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Windows 7 Computers Fresh install of Windows 7 this Computer great for gaming, office work, surfing the net, watching movies generally a good all round system from £150 +p&p might also have laptops price on request please email or call me for more information
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Sapphire ATi Radeon HD3850 512MB 256Bit GDDR3 AGP 8x DUAL DVI/HDTV Graphics Card to of the range AGP GFX card i beleve it supports DirectX 10 great for gaming, watching movies, video editing, CAD/CAM applications and any other high demand gfx programs generally a good all rounder £80 +p&p please email or call me for more info

Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Windows XP Pro Computers

Fresh install of Windows XP Pro this Computer great for gaming, office work, surfing the net, watching movies generally a good all round system from £100 +p&p might also have laptops price on request please email or call me for more information

Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle 3Ghz AMD 64bit CPU 512MB Ram 5xpci 2xSATA 2IDE 1Gb LAN 6 channel sound firewire COMES WITH DRIVER CD AND MANUAL great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required £35 + p&p please email or call me for info
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Fans different sizes and types please email or call me for a price
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Laptop CPUs mainly Intel different speeds please email or call for prices
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle 3.2Ghz Intel 64 bit CPU 1GB Ram 2pci-e 2xpci 2IDE 2SATA 8usb ports LAN 6ch sound COMES WITH DRIVER CD AND MANUAL Great for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad to MicroMartClassifiedAdverts@gmail.com and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Tape drive backup. Either DAT320 or later generation LTO system in good condition. Please contact me.
Tel: (07949) 407022 Email: tape.20.odayly@spangourmet.com

WANTED: You bought a Corsair water cooler, with a square block. You fitted it to your Intel processor. You want to make a few pounds from the spare A.M.D. bits? Contact me!
Email: johnrpeel@gmail.com

WANTED: Gigabyte GA-Z77X-D3H motherboard wanted.
Email: johnbeiry@gmail.com

WANTED: PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.
Tel: Bill (07742) 061569 or (02641) 769503.

WANTED: 3G dongle for Archos 80 G9 tablet.
Email: alancox28231@gmail.com

SOFTWARE FOR SALE

Sim City 2000: Boxed and original. Classic gaming. £15.00
Tel: Gordon (01314) 660205 Email: scobie09@gmail.com

Adobe Photoshop Elements and Premiere Elements 12 Full Version - Windows/Mac. Original Boxed CD with unused product key. £47.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

PCB design software. 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99
Tel: Nigel Wright (07967) 527693
Email: cresswellavenue@talktalk.net
Microsoft Office 2013. Original Software only £100.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Cyberlink PowerDVD 12 Standard. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Nuance Omnipage 18. OCR; Windows 8, 7, Vista or XP, Original CD with unused product key £25.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Norton Family Premier 2.0. Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

SOFTWARE WANTED

Good Text to Speech program WinXP or 7 to read ebooks aloud for a pensioner with few resources.
Tel: Wilf James (01767) 699809

Wanted: PictureToExe software, for making picture shows.
Tel: (01202) 610602
Email: ivor.mary@talktalk.net

Wanted: Quicken 2001. I desperately require a copy of QUICKEN 2001, UK Edition. I need to reinstall the program but have lost my original installation CD.
Email: david.maddams@icloud.com

IMPORTANT BUYING ADVICE

We work very hard to police our classified ads, and make them as secure as possible.

However, please do your bit too and use the following guidelines:

- **Never - NEVER** - pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.
- Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk
- Keep copies of all correspondence
- When sending out goods, at the least obtain a certificate of posting from the Post Office

If you are in any doubt, feel free to send us a mail via editorial@micromart.co.uk.

Every year, thousands of successful transactions take place through our classifieds, and that's just how we like it.

Help us help you keep them one of the safest and most secure places to buy and sell computer kit.

ASK AARON



Meet Aaron Birch. He's here to help you with any general upgrading, software and system building problems. He's got advice aplenty and you're very much welcome to it!

Send your questions to:
Aaron Birch
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

A Hot Outlook

I hope you can shed some light on my problem, as Microsoft can't – or won't.

When I try to log in to my usual email account, I get a message telling me that the account doesn't exist even though I've had it for 11 years and used everyday.

At first I noticed half of my folders had gone, next I found I could not log in and that's when I get the message saying my email account doesn't exist.

Microsoft have gone from bad to worse since it dropped the wonderful XP. I still use the 64-bit version, and I'll never use the other rubbish it's released. I've tried to sort it out with support, but all the people I spoke to are reading from a script, and none of them have a clue. So, I'm turning to you for help.

Peter

You haven't said in your email exactly what email account you're using, but as you mention Microsoft support and having to log in, I'm assuming your problem lies with your Hotmail account, Microsoft's web-based email service (which you also used to send me the mail).

This being the case, I can only initially come to the conclusion that your account has been inactive for a prolonged time, as your problems match the same problems others get exactly when they don't use an account for a while.

Basically, the official rules of Hotmail state that an account that has been inactive for 270 days will be deleted, and that all folders and contacts will subsequently be removed – with incoming messages being returned to the sender as undeliverable. The account name is still reserved unless you fail to log on for another 90 days after the 270, in which case the whole account may be deleted.

On a side note, a Windows Live ID will be deleted after 365 days of inactivity.

If your Hotmail account is tagged as inactive, the data removed is permanently deleted, so there's no way to get it back.

Now, you did say in your mail that you used the account every day, so this causes some confusion, as your account shouldn't be tagged as inactive. I believe this may be down to one of two things.

The first, and most likely cause of this annoying problem is my suspicion that you may need to log in using your 'new' Outlook account. Microsoft migrated all old Hotmail accounts to Outlook.com accounts, the new online email service, a while back. Hotmail addresses were then added to the new Outlook account as email aliases. The Hotmail addresses still work, but are simply alternate addresses tagged onto the main Outlook moniker.

Try to log on to your email as normal, but instead enter the address as an Outlook entry. So, for example, if your address was previously Peter@Hotmail.com, it would now be Peter@outlook.com. This may well get you back into your email without fuss.

I've seen some users have problems with Hotmail account deletions when using Outlook as the client. Linking a Hotmail account to a local email client, such as Outlook has caused some people to have problems, as it would seem as though Hotmail may only count web browser log ins, not access via Outlook. This leads to the 'inactive' account being removed, even though it's always used.

I've never come across this particular issue myself if I'm honest, and it sounds a little suspect to me as even Outlook needs to log in to the Hotmail mailbox, but according to some reports, it's a problem. If this is the case with you, sadly there's little you can do, or that I can recommend you do, as the same rules I stated above apply to this situation – and the account will be deleted.

I strongly suspect this isn't your problem, though, and instead it's a simple change of login using the new Outlook address, so be sure to give this a go and good luck.

▼ **Hotmail has merged with Outlook.com, so double-check your email login**



Hotmail



Outlook.com

Driver Reset

I think that I've caused some problems on my PC, as it's become a little unstable. I don't do that much to it myself, and try not to mess around, but I have tried to keep drivers up to date. I think this may be the cause of my problem, as I fear I have updated the wrong driver. Sadly, I can't recall what driver it may be, which leads me to my current predicament.

I've seen on my PC that I can perform a factory reset, which I believe may help, that is, if it resets all my drivers. I'm not sure about this, though. Will resetting my PC reset the drivers, and if so, will it leave my data alone? If so, I can easily fix my PC, which would be very handy.

Dave

A PC factory reset would fix your problems with drivers, but I wouldn't do this right away as it'll also wipe all of your data and any programs and software you've installed. Only the software and drivers that were on the PC when you got it will be present afterwards.

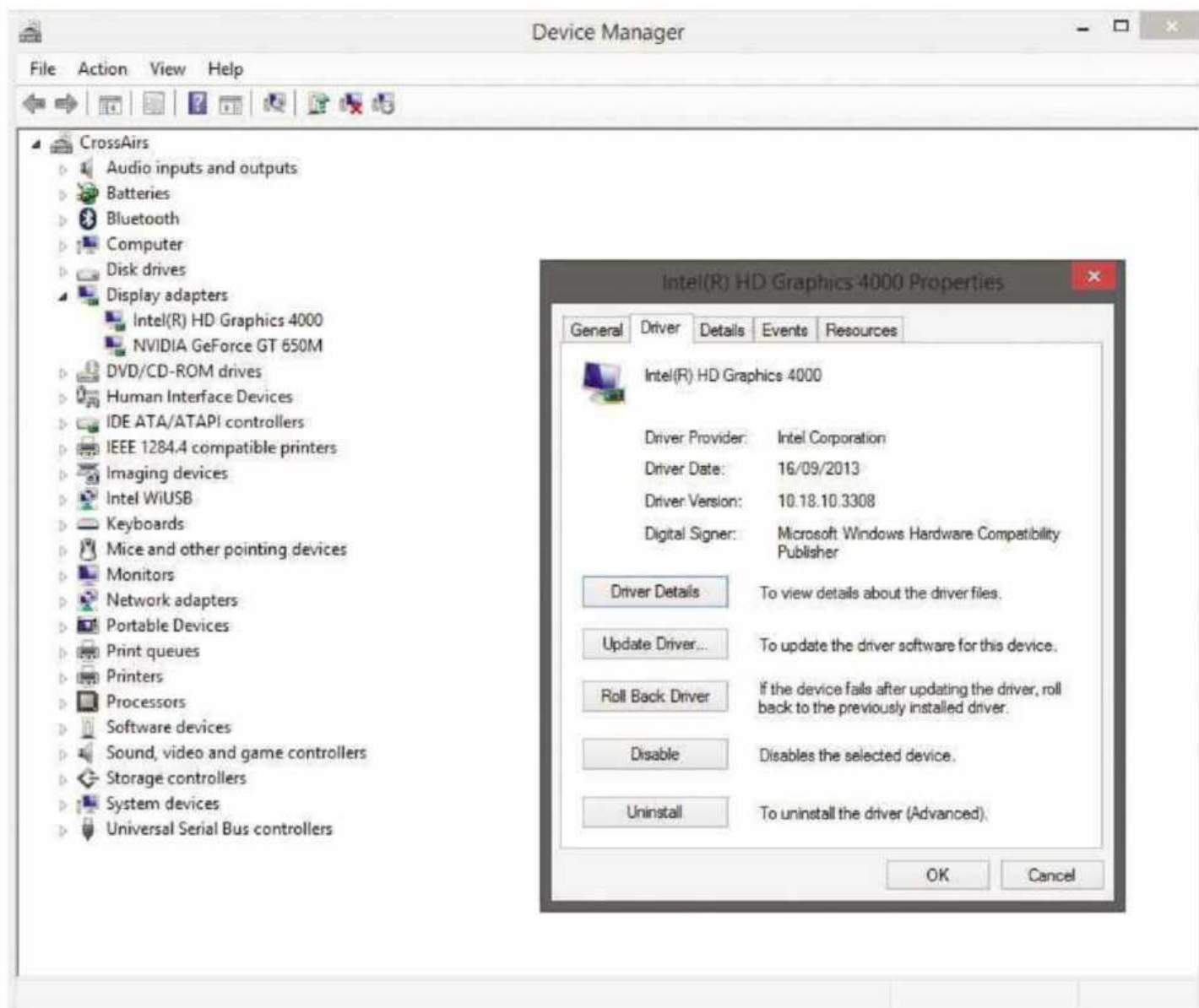
Before you do a factory reset, be sure you backup all of your data to another device or media, and ensure you have all of your

software installs to hand, or can get them again easily. Once you've done this, you can perform the reset.

Alternatively, it may be advisable to try and fix the problem without a reset. If you can think of the date when you first noticed problems, try simply using a System Restore point to roll the PC back to a time prior to any problems. This will save you a lot of time.

You could also go through Device Manager in Control Panel and uninstall various devices you may have updated. You'll probably have some idea of what kind of hardware you've upgraded, so stick to these, and install correct, working drivers, or ones that came with your system (if you have any). You could also leave this, and simply reboot. Windows will attempt to use its own pre-installed drivers, which should run without issue. They may not be optimised, of course, but at least you'll be able to create a stable platform, which you can then work on upgrading one driver at a time, making sure each driver works well before moving onto the next.

▼ Removing device drivers and using Windows' built in defaults can help create a stable system to work from



ASK JASON



Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

A Right Old Pasting

I've got an HP Pavilion DV7-3101sa laptop. It's over five years old now and still works okay, especially after the upgrade to Windows 10. However, it gets hot and it gets noisy (occasionally it'll reboot, presumably after overheating). I'm guessing the cooling system is clogged and needs cleaning. How easy would it be to do this? Is it a DIY job, or should I take the laptop to a shop?

J Roberts, Gmail

I think you're right: the cooling system wants a damned good clean. Can you do it yourself? Certainly, though the laptop will need almost complete disassembly. Even the screen will have to come off. Don't be dissuaded, though. A detailed guide can be found at <http://goo.gl/LjuUES>. This uses a 3-series DV7t, but the differences to your model are negligible.

Once the cooling system is detached from the motherboard, you'll see it's a large, single assembly. There's a fan, two or three copper heatpipes, and a couple of aluminium blocks. Unscrewing the fan will give access to the assembly's vents. Your best bet is to run these under a tap to wash out the dust – use a blade to push out any stubborn bits. Also, give the fan blades a good seeing to.

Parts of the aluminium blocks will be covered in thermal paste, and most likely this will be baked solid. Clean it off with isopropyl alcohol (not vodka or beer!). A 500ml bottle should only cost a fiver. Also clean off the paste on the CPU and GPU on the motherboard, then apply some new stuff to them. A pea-size blob is all

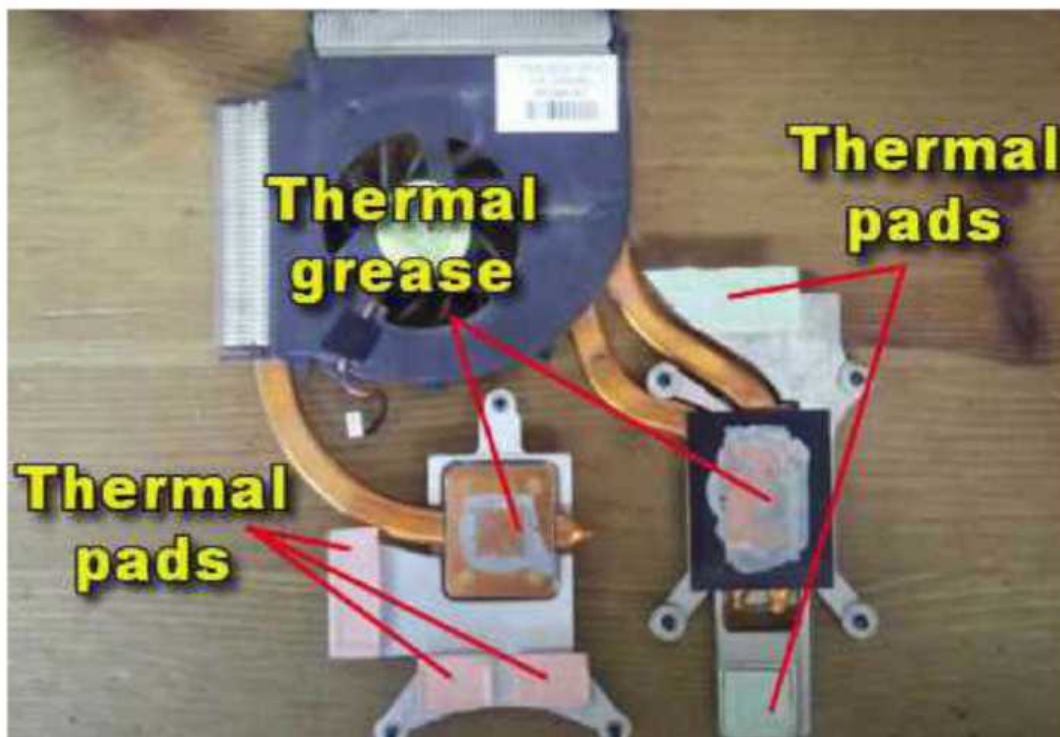
you need – use a debit card (suitably cleaned) to roughly spread it (pressure from the refitted assembly will even it out). For a top-drawer paste that's priced at rock bottom, try Cooler Master's IC Essential E1 – about £4 for a tube.

You'll also notice that the assembly has numerous thermal pads. These cover the chipset, CPU voltage regulators, and GPU RAM chips. Clean these pads gently, again with isopropyl alcohol. They need to remain intact, and don't be tempted to put thermal paste on them.

Then you've just got to fix the whole lot back together again! The entire process, from disassembly to reassembly, will probably take at least two hours (you'll get quicker with practice). Apart from a crosshead screwdriver, vital tools are patience and organisation. Give yourself lots of space and make sure you keep track of where the screws go – there'll be lots of different sizes. Use a big piece of card and label each part appropriately. And good luck!

Note – If the fan's noisy or you suspect it's wearing out, pop in a new one. It's probably a good idea to do this even if you think you don't really need to. I paid £6 for mine (my mom has a similar laptop). Make sure the replacement is designed for 3-series DV7s, as fans for other DV7 series may not fit.

▼ **Cleaning a laptop's guts is pretty much the same process regardless of model [image courtesy of www.insidemylaptop.com, showing a 3-series DV7t cooling assembly]**



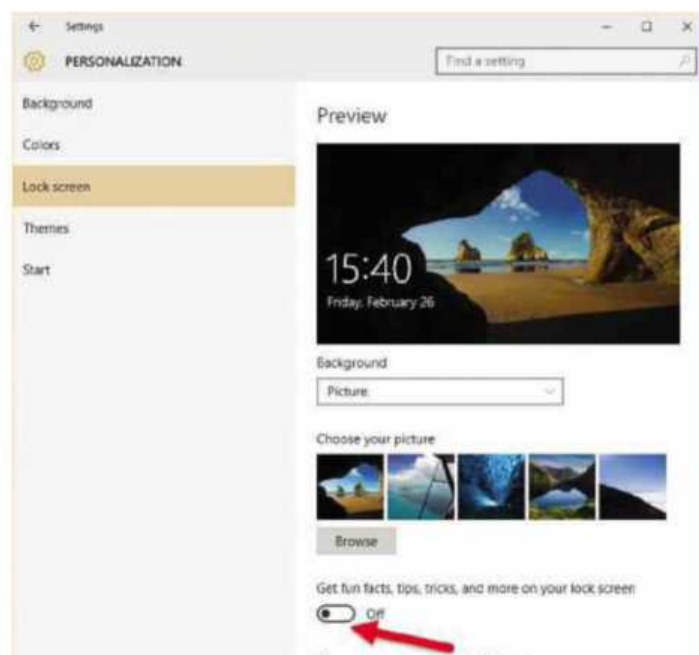
Tanstaaf!

Apparently Microsoft has just started a global roll-out of adverts on the Windows 10 lock screen. Now we know why the upgrade was free! Am I the only one who thinks this is outrageous? What right does Microsoft have to take over my PC? I'd rather pay for Windows 10 than have to look at adverts for Microsoft's other products.

Don Marks, West Yorkshire

I'm guessing this refers to the ad for Rise of the Tomb Raider that many users have been seeing. I've not witnessed it myself. As you say, Don, the Windows 10 upgrade is free – I won't be at all surprised if the July cut-off for that is quietly dropped – and Microsoft clearly has to make money somehow. It plans to do this via advertising, just as Google, Facebook, and many other companies do. The huge uptake of those companies' services shows that most people aren't too fazed by this.

Microsoft does give you a way to opt out (which can't be said for some other companies!). Click Start > Settings > Personalization. In the new window, select 'Lock screen'. Make sure Background is set to Picture or Slideshow, not 'Windows spotlight'. Lastly, switch off 'Get fun facts, tips, tricks, and more on your lock screen'. Job done! If you also want to banish ads from the Start menu, select Start instead of 'Lock screen' and switch off 'Occasionally show suggestions in Start'.



▲ Adverts are coming to Windows 10, and here's how to stop them...

Platter Chatter

My hard drive's died! It's a 1TB Samsung Spinpoint F1, which must be at least eight years old (the PC it sits in is a bit newer). I've tried to recover the data but have got absolutely nowhere – it's just not there. I'm assuming the circuit board has had it, and am I right in thinking it could be replaced? I recall reading about this once. Any advice you can give would be warmly received, as the data's quite valuable and I'd prefer to avoid sending the drive to a costly specialist.

Peter, TalkTalk

An HDD usually fails because of bad sectors on the platters (surface damage) or a problem with the read-write heads (a jammed actuator arm, perhaps). In those cases, swapping the PCB won't help.

When a PCB gives up the ghost, there's usually a scorch mark on either the motor-driver chip or the controller chip. Heat kills everything electronic eventually. Can you see any such marks, Pete? Also, a drive with a failed PCB typically won't even be detected in the PC's BIOS/UEFI. Does yours show up? These aren't hard and fast rules – especially since much of an HDD's 'firmware' is stored on the platters, not in the silicon – but in my experience they're reliable guidelines.

*If you think the PCB *is* the problem, general advice is that the replacement should be identical. It should have the same product code, be from the same drive series, and be from a drive with the same capacity. To be honest, I've had success when just using a PCB from the same drive series, ignoring the product code and capacity, but admittedly I've not fiddled with an HDD in this way for a few years now. Maybe things have changed.*

If you have no luck sourcing a donor drive from the likes of eBay, try www.hdd-parts.com. It's a very amateurish site and not too cheap – typically \$39.99–\$49.99 for a PCB – but I've heard good things and there's UK delivery. Also try www.hddzone.com. Both sites provide basic removal and fitting instructions (it's a doddle).

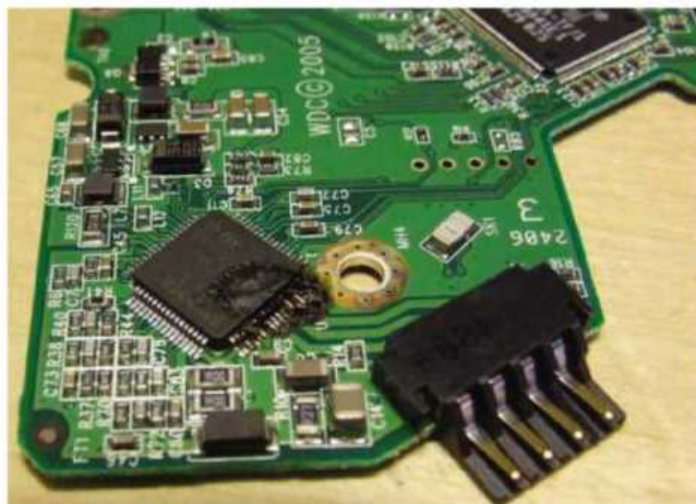
Both sites also state that the BIOS chip from the old PCB needs to be soldered onto the new PCB. Again, I've never had to do that, but

maybe it's necessary these days. I doubt it, but if your PCB swap doesn't bear fruit, Pete, that would be the next step.

But remember – if your HDD is being detected, you'd do well to skip all of this PCB work and put the money towards sending the drive to a data-recovery expert. Kroll Ontrack (www.krollontrack.co.uk) is the biggie, though there are plenty of others, including, for example, Data Recovery Direct (www.datarecoverydirect.co.uk). For a 1TB drive, I don't expect you'd see any change from £300.

Note – SSDs are a different prospect altogether! Failure almost always comes down to the flash chips or main controller, and everything's on one PCB. There's nothing that can really be swapped. Furthermore, the one time I've sent an SSD to a data-recovery expert, it was returned as being beyond salvation.

▼ Sometimes the cause of a failed HDD can be a burnt-out controller, and replacing the PCB should get your data back



Crowdfunding Corner

Kickstarter isn't the only crowdfunding service in the world. This week, we're looking at a pair of projects from its slightly less popular but equally interesting crowdfunding cousin IndieGoGo.

TuneBox2: Turn Your Speakers Into Wireless Players

Smart speakers, which have connections to online services like Spotify, are a fantastic way to fill your home with all the music you could ever want. Unfortunately, they either cost a lot or aren't very good. And indeed, many of us have decent home speakers already, so it makes no sense just for some online functionality.

The TuneBox2 is the solution to that quandary. It turns virtually any speaker into a smart speaker. It supports services like AirPlay, DLNA and Spotify Connect for seamless wireless control from your PC, smartphone or tablet. You can link up to ten devices on a single network, allowing you to control the sound in virtually your entire house. In addition, the wireless capabilities of the TuneBox2 mean it can act as a wireless access point as well.

If you're a fan of more conventional audio inputs, the TuneBox 2 has a 3.5mm aux port, which can be used to stream audio to any TubeBox2 connected speakers from virtually any conventional device without wi-fi, from record players to iPods. There's a digital music port so you can connect high-quality sources like TV and home cinema systems, and a built-in amplifier to ensure you can beef up the volume without distortion or background noise.

If this sounds good to you (and it probably should), you can pick one up for \$55 + shipping (a total of \$70 or about £50) using the early bird tier, but if you miss that, it's only \$10 (£7)

more at full price. If it meets its target (and it should), then it'll start shipping in May 2016.

URL: bit.ly/1S2bKhF

Funding Ends: Thursday, 24th March 2016

JmGO View Projector: A Theatre In Your Backpack

Ever wished you could enjoy movies and gaming in 180" widescreen format for a reasonable price? Well, depending on your definition of reasonable, the JmGO View might be the gadget you need. This compact projector has a durable, lightweight, fully metallic casing and packs in the ability to play 3D movies on any flat surface and Dolby Surround Sound Plus speakers. You can even use it to play Bluetooth audio off your phone or laptop.

The projector runs on Android, so you can use it to run tons of apps natively, or you can connect it to a more conventional HDMI source such as a decoder box, Blu-ray player or games console – even a USB storage drive. A remote control allows you to interact directly with the device, or you can use an Android app to control it over wi-fi (apparently an iOS version is coming soon).

It doesn't come cheap, though: the early bird price with UK shipping is \$474 (£340), so you'll need to get your spare wallet out for this one. But if the product is half as good as it looks, it's going to be worth it. It too ships in May 2016 and has a month left to hit its \$100,000 target.

URL: bit.ly/1S2bXBD

Funding Ends: Thursday, 24th March 2016



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Foodie

David takes a break from eating all the pies, to take some pictures of them instead...

There's a strange phenomenon that arrived with social media, whereby users take photos of the food they're eating and post it for all to see.

We don't mind, really. After all, we're rather fond of our food, and when we see something that looks good and tastefully arranged, we're usually the first to attempt to mimic it. And we need something to look at when Nigella isn't on the telly.

Sadly, though, not all food images come out too well. Some are blurred, others don't bring out the colours of the various vegetables, and there are other concerns too, such as the background

and environment. So how would you take the perfect food shot?

Foodie

Thankfully, a new app may have the answer for you. Foodie, by Line Corporation, is a free Android and iOS app dedicated to taking the perfect photo of your delicious culinary delights. There are tons of options available to help you get that great food shot, with over 26 different filters to bring the best out of a meat dish, sushi, cake and so on.

In addition to that, you can edit the picture after you've taken it to help bring out the colours of both the food and the

Features At A Glance

- Over 26 filters customised for taking food photos.
- Amazing photo editing features that transform simple food photos into one-of-a-kind masterpieces.
- Camera shot angle based auto blurring effect.
- Smart guide feature that helps you photograph food from directly above it.
- Share photos to social networks.

environment in which it was set. A good example is a strawberry ice cream shot with the clear blue skies and sea behind.

There's also an auto blurring effect that can bring out the emphasis of a certain section, such as a juicy steak, while leaving the cutlery or steaming potatoes in a subtle blur in the background. And the app will help you make sure that a flat, top-down photo is positioned perfectly before you take the shot.

Naturally, as soon as the image of the food has been taken, edited and tweaked, you have the opportunity to upload it to a selection of social media platforms, such as Facebook, Twitter and Instagram, as well as through the Line Corporation network.

Mmmmm... Food....

Taking pictures of your food has gone from being a fun pastime between friends, to becoming something quite professional. Those who can decorate the inside of the latest cookbooks have a lot of technology on hand. With Foodie, you can now get some great images without spending anything.

With more filters and effects ready for release in the future, Foodie looks to be on the ball and will undoubtedly be the single best source for amateur food photographers for some time to come.

For now, we're feeling a little peckish, so it's off to the kitchen to see what we can rustle up.



▲ Foodie can bring out the best from your food shots



▲ Make some mouth-watering pictures of your latest culinary delight

Logging Off

This week, my home network had a problem, the likes of which I've never previously experienced. It started small enough, with my PC not being able to reach the rest of the network. This was something I was able to address easily by asking for an adapter 'diagnosis'. I checked cables, reset hardware, but the problems continued, until one day my entire network effectively went haywire!

What blew my mind was that every device physically connected to the network started to malfunction, often in very odd ways. My Samsung TV worked fine, other than you couldn't adjust the volume. And the BT Home Hub 5 stopped its wi-fi service and its broadband connection, and went invisible to all connecting devices.

I've seen a network collapse before, but nothing like this.

Eventually, I resolved to remove two items that I considered potential catastrophe candidates: an access point and a small gigabit switch. Then I turned every item off, disconnected all the cables and started to rewire the whole affair, starting with the router.

With the router not physically connected to anything else, it started to function normally, and from there I got my big gigabit switch operational, and eventually my servers and PC. What's interesting is that the system now works even better than it previously did, suggesting that something had been wrong for some time.

What I haven't yet done is brought back online parts of the system that aren't currently in use, like the subnet on the second floor, because it's not really a priority.

Fixing things is heart-warming, yet part of me is rather irritated that I don't really have enough evidence to isolate exactly what caused the problem. Part of me wants to recreate the problems, so I fully understand what occurred. But the more pragmatic side of my personality would just like things to work reliably, so I can work.

There is one potential culprit I've not yet checked: an eight-port switch in the attic that services the upper deck. At this time, it's disconnected from the rest of the network. What has happened before is that a short power surge/blip has sent this hardware out of kilter, where it refuses to route packets correctly and just flashes away on all ports.

EDITORIAL

Editor: Anthony Enticknap
theeditor@micromart.co.uk

Designer: Laura Jane Gunnion

Designer: Nat Florey-Abbotts

Bonus John: John Moore

Contributors: Mark Pickavance, Jason D'Allison, Joe Lavery, Sven Harvey, Simon Brew, Dave Edwards, Ryan Lambie, James Hunt, Mark Oakley, Roland Waddilove, Cream Crackers, Cereal Bars, Sarah Dobbs, David Hayward, Michael Fereday, Ian McGurran, Aaron Birch, David Briddock, Craig Grannell, Kevin Pocock, Andrew Unsworth, Dave Robinson, Rob Leane,

Caricatures: Cheryl Lillie

ADVERTISING

Group Ad Manager:

Andrea Mason

andrea_mason@dennis.co.uk

Sales Executive:

Joe Teal

Tel: 0207 907 6689

joe_tea@dennis.co.uk

US Advertising Manager

Matthew Sullivan-Pond

matthew_sullivan@dennis.co.uk

MARKETING

Marketing Manager:

Paul Goodhead

Tel: 0207 907 6393

PRODUCTION

Production Coordinator:

John Moore

MicroMartAdCopy@gmail.com

Digital Production Manager:

Nicky Baker

SUBSCRIPTIONS

Save 24% on the cover price:

£77.50 for 51 issues by credit card.

Visit subscribe.micromart.co.uk

Tel: 0845 126 1014

ONLINE SUBSCRIBER SERVICE

www.ManageMyMags.co.uk

Change your address, renew subscription or report problems: call 0844 844 0082 (UK) or email micromart@servicehelpline.co.uk

NEWSTRADE SALES

Newstrade Director:

David Barker

DENNIS PUBLISHING

Group Publisher:

Paul Rayner

paul_rayner@dennis.co.uk

Managing Director:

John Garewal

Group Managing Director:

Ian Westwood

COO: Brett Reynolds

CEO: James Tye

Company Founder: Felix Dennis

PUBLISHED BY Dennis Publishing

30 Cleveland Street
London
W1T 4JD

Tel: 0207 907 6000

www.dennis.co.uk

PRINTING

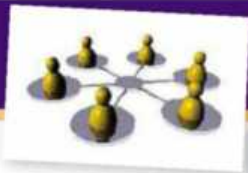
Printed By: BGP

Distributed By: Seymour

Certified Distribution:

13,712 average copies
Jan-Dec 2010





I might take the time to go up there just to see if it's flashing uncontrollably or even just to power it off, while it isn't required.

What's fascinating to me is that I never thought I'd be doing these type of problem solving at home, as these were once things I often did at work. But compared with my first couple of IT jobs, I have a much more sophisticated network these days than I had in that working environment.

That's a rather telling point, because I wonder how many people now have home networks that require professional IT level knowledge to maintain or fix.

With that in mind, perhaps it's about time that I started to formally document the system, so that should someone else inherit it, they'll have some sort of clue where to begin.

Along the way, I might work out how I managed to entirely trash mine, seemingly without making any modifications that might be to blame.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Turing Machine, 8 Old-Hat, 9 Garuda, 10 Dropbox, 12 Admix, 14 Acorn, 16 Bracket, 19 Evolve, 20 Upbeat, 22 Freudian Slips.

Down: 1 Dull, 2 Bishop, 3 I Got You, 4 Gauge, 5 Shared, 6 OneDrive, 11 Recovery, 13 Arduino, 15 Roll-Up, 17 Cobalt, 18 Helix, 21 Apps.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Recently, we've been learning a bit about web design, and that's meant taking notes about HTML, CSS and other such things. It also requires us to use pen and paper – something that's becoming increasingly foreign to us, because most of what we do here

is achieved with computers and software. Almost everything we write is done using a keyboard. As a result, it seems our ability to make letters and words using a pen has atrophied dramatically. We never really had particularly attractive handwriting, but it was at least legible. These days, we're lucky if our scribble and scrawls can even be interpreted by ourselves. In fact, it's got so bad, we can't even seem to write our own names without making a mistake or two. Thankfully, the people who deliver our online shopping don't care if we sign our names as 'Amtohny', 'Jhon', 'Luara' or whatever. Put it on a passport renewal form or tax return, though, and suddenly it's a big deal...

THIS WEEK'S CROSSWORD

Across

7 Rare ability to identify or to vocally produce any note on the musical scale, without reference to another heard tone. (8,5)

8 A chess piece shaped to resemble the head of a horse; can move two squares horizontally and one vertically. (6)

9 A posting on a social networking website that indicates a user's current situation, state of mind, or opinion about something. (6)

10 An unstable subatomic particle classified as a baryon, heavier than the neutron and proton. (7)

12 A design prepared on special paper for durable transfer on to another surface such as metal or plastic. (5)

14 An expression whose meaning cannot be inferred from the meanings of the words that make it up. (5)

16 A company or employee of a company that transports commercial packages and documents. (7)

19 An incorporated society of insurance underwriters in London, made up of private syndicates. Founded in 1871 originally to deal only in marine insurance. (6)

20 A priest or priestess acting as a medium through whom advice or prophecy was sought from the gods in classical antiquity. (6)

22 Intervals between parts of a play, film or concert. (13)

Down

1 An internationally agreed system of identifying bank accounts across national borders. (Acronym) (4)

2 Hardware that connects to a computer for the purpose of copy protection or authentication. (6)

3 A public sale in which goods or property are sold to the highest bidder. (7)

4 A set of forms taken by a verb to indicate the time of the action in relation to the time of the utterance. (5)

5 An optical illusion caused by atmospheric conditions, especially the appearance of a sheet of water in a desert. (6)

6 Correct in all details. (8)

11 Singing by changing back and forth between the chest voice and a falsetto. (8)

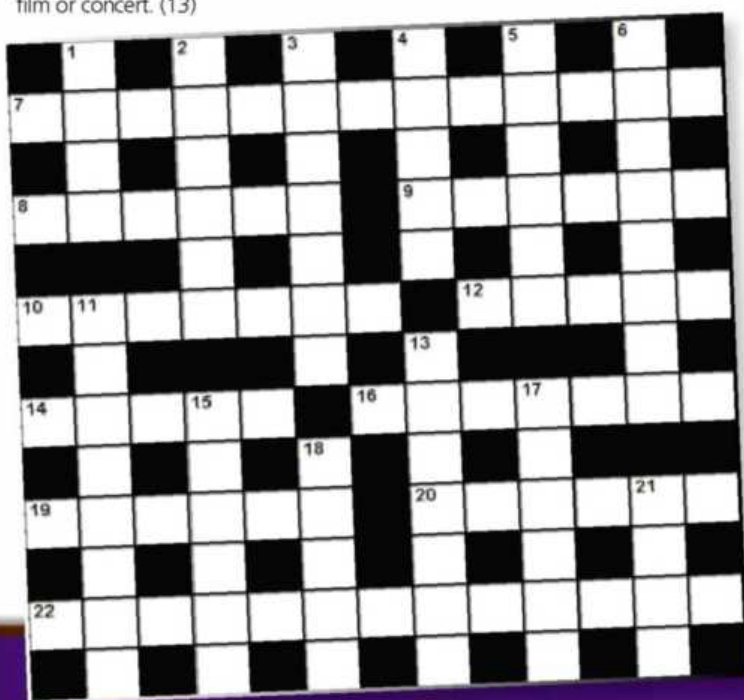
13 Exceptionally large statues. (7)

15 Constitutes 21% of the earth's atmosphere by volume. (6)

17 Someone who handles equipment for travelling entertainers. (6)

18 What a good boss should tell you to do if you're not sure about something. (3,2)

21 A concept which includes but is not limited to an infinitely-extended one-dimensional figure with no curvature. (4)



In Next Week's Micro Mart*

- How to get a solid-state drive for just £5
- Essential tips and tricks for the Chromecast
- How to get more from the Kindle Fire tablet
- Plus the usual mix of news, features, reviews and advice



* May be subject to change

iiyama G-MASTER™ MONITORS **FOR** GAMERS

RED EAGLE™

GB2488HSU | GB2788HS

24"

27"

144Hz

Free
Sync

Panel	LED 1920 x 1080
Response time	1 ms, 144Hz, FreeSync™
Features	OverDrive, Black Tuner, Blue Light Reducer, Predefined and Custom Gaming Modes
Inputs	DisplayPort, HDMI, DVI
Audio	speakers and headphone connector
Height adjustment	13 cm



gmaster.iiyama.com

Secure Your Data

USE PROMO CODE
MM0316
FOR A 15%
DISCOUNT FOR
ALL OF OUR
PRODUCTS

Hardware Encrypted
(AES 256-bit)
USB 3.0 Flash Drive



PIN activated
(7-15 digits)



Works with PC, Mac,
Linux, Citrix, Android,
Thin Clients and
Embedded Systems



CITRIX



No Software
required



Capacities of 8GB,
16GB, 32GB, 64GB



Dust and water
resistant durable
aluminium housing.
Certified to
IP57 rating



The iStorage range



iStorage
SECURING THE MAINSTREAM

Call **+44 (0) 20 8991 6260** or
visit **www.istorage-uk.com**